

# Preventing tuberculosis infection and disease among healthcare workers

## Introduction

In 2017, 24 Victorian health care workers (HCW) were diagnosed with TB. Similar to the general population with TB in Victoria, 22/24 (92%) were born overseas, and none were considered likely to have contracted TB infection locally. While health care work internationally is recognised as a significant risk factor for the acquisition of infection with *M. tuberculosis*, in low incidence settings such as Victoria the risk of transmission of TB to patients in clinical settings is an important consideration in efforts to prevent TB infection and disease amongst HCW.

Although the majority of cases of active TB in Victoria are treated by specialist units within a few major hospitals, all potentially infectious pulmonary cases must be identified early (before or at the time of admission, if the patient is admitted) and appropriate precautions immediately instituted to prevent transmission of infection to staff, patients and visitors. In this context, the challenge is to provide appropriate and feasible strategies to protect health care workers, with particular attention to those HCW most likely to be exposed to cases of TB.

This guideline deals primarily with reducing risk of TB disease amongst HCW through detection of latent TB infection. Preventing TB exposure to healthcare workers, such as through appropriate isolation of patients with suspected tuberculosis and use of adequate personal protective equipment, is dealt with separately (Chapter 6: "Hospital care of tuberculosis"). This present guideline draws substantially in language and recommendations on recommendations issued by Australia's National Tuberculosis Advisory Committee in February 2018, entitled "Management of Tuberculosis Risk in Healthcare Workers in Australia", with relevant modification for the Victorian context.

## Occupational Health and Safety Legislation – Duty of Care of Employers and Employees

The Victorian *Occupational Health and Safety Act* defines the duty of care of employers as being "to eliminate risks to health and safety so far as is reasonably practicable" and if it is not reasonably practicable to eliminate them, "to reduce those risks so far as is reasonably practicable". This duty extends to staff, students, patients, visitors, volunteer, contractors and others who enter the facility. Employers must assess and control health and safety risks, monitor the health of employees and provide information, instruction and training to enable their employees to perform their work safely and without risks to health. Employees have a duty to take care for their own safety and cooperate with the employer's actions to provide a safe workplace.

## Pre-employment Screening

Healthcare facilities are responsible for providing assessment and screening services including a test for latent tuberculosis infection (LTBI), chest x-ray and appropriate referral processes for the interpretation and follow-up of such test results. Assessment and screening must be undertaken by clinicians appropriately experienced in testing and management of TB. While some facilities may have internal arrangements for testing and follow up (e.g. through staff health clinics and respiratory or infectious diseases outpatients clinics), alternative pathways should be made available for HCW requesting independent assessment.

In this document, 'HCW' is intended to incorporate those anticipated to have direct clinical contact with patients, including students undertaking placement at a health care facility, locums and agency staff.

The rationale for pre-employment screening determines who is tested and the action taken from results. The rationale is threefold:

- a. obtaining a baseline test result in case of future testing after exposure at work;
- b. identifying LTBI in HCWs that warrants preventive therapy; and

c. identifying active TB in HCWs.

Pre-employment screening involves a risk assessment in all HCWs. There are two elements of this risk assessment:

a. The pre-test risk of LTBI.

This can be broadly categorised as high or low based on risk factors for LTBI.

Specifically a new employee has a “high” risk for LTBI if:

- born, or worked for more than 3 months, in a country with higher TB incidence. In HCWs this is arbitrarily set at an incidence rate of greater than 40 per 100,000<sup>1</sup>; or
- known past history of contact with TB (work or personal).

b. An estimate of the probability of future TB exposure.

This is determined by the historical incidence of TB in the facility and the specific work place of the HCW.

In Victoria, it is recommended that all HCW have a baseline test for LTBI at the commencement of employment. It is important that screening test results are formally recorded and permanently retained for future reference, and that copies are made available for employees to allow transfer of results to subsequent workplaces.

HCWs requiring a screening test for LTBI can have a tuberculin skin test (TST) or an interferon gamma release assay (IGRA, such as the QuantiFERON-TB Gold assay, Cellestis/Qiagen, Carnegie, Australia). IGRAs offer the advantages of improved specificity in a low prevalence setting, a lack of a booster effect with repeated testing and the convenience of a blood test.

However, problems with interpretation of results near the cut-off and what determines a conversion, as well as the expense of the test, are disadvantages of IGRAs. For HCWs that

undergo routine recurrent testing the choice of test remains controversial. High rates of IGRA conversions and reversions have been reported leading to more costly follow-up of screen-positive subjects. These conversions and reversions tend to occur more frequently when the initial QIFN result is close to the cut-off (0.35 IU/ml). The National Tuberculosis Advisory Committee (NTAC) recommends that either a TST or an IGRA are suitable as a single screening test, apart from when a HCW is likely to undergo serial testing, when the preferred role of IGRAs is limited to supplementary testing to improve specificity. Importantly, it is desirable to minimise serial testing for LTBI outside of contexts where significant epidemiological risk of unrecognised transmission exists, to reduce the risk of false positive test results. Therefore, it is recommended that HCW with a previous documented negative test result should only be rescreened (e.g. if transferring to a new health care facility) if greater than 12 months has elapsed since previous testing AND a period of potential interval TB exposure is identified. Potential TB exposure in this context aligns with the ‘high risk’ definitions above, where either a known history of TB contact or more than 3 months stay in a country with higher TB incidence has occurred.

When a HCW does not undertake a screening test, the reason for this should be recorded and the HCW should be counselled about prompt presentation with symptoms suggestive of active TB. This may occur because the screening is not warranted e.g. a history of active TB or documentation of a prior positive screening test. Alternatively, HCWs that do not consent to a screening test that is recommended should be advised of the potential risks involved and should acknowledge in writing their non-participation. Pre-employment screening for active TB should be performed in HCWs with a high pre-test risk for LTBI, especially if a pre-employment test for LTBI is positive. This includes a symptom screen and chest x-ray.

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<sup>1</sup> TB incidence rates by country can be obtained from <http://www.who.int/tb/country/data/profiles/en/>

HCWs with a positive pre-employment screening test for LTBI should be considered for preventive therapy, in consultation with a physician with expertise in TB medicine. HCWs that do not take preventive therapy may also be considered for follow surveillance for active TB, especially if they have recently arrived from a country with high TB incidence (see definition above). This is to detect TB reactivation early, and usually involves 6 monthly symptom screening and a chest x-ray for 2 years.

Prospective HCWs that are identified in pre-employment screening to be immunocompromised should have their work position carefully assessed and, if necessary, modified to avoid potential exposure to TB.

### **Post Exposure Contact Tracing**

Contact tracing amongst HCWs that are exposed to TB through the course of their work should be undertaken according to usual contact tracing principles and practices. Infection Prevention services should contact the Victorian Tuberculosis Program for guidance in conduct of contact tracing, and report testing outcomes for program follow up.

The extent of post exposure testing of HCWs, in general, depends on the degree to which the index case was isolated, the estimated level of infectiousness of the index case and the amount of contact that the HCW has with the index case. Post exposure testing for LTBI should use the same test for LTBI (TST or IGRA) as was used for the pre-employment screening test. Reference to the pre-employment or “baseline” result aids interpretation of the post exposure result by more clearly determining if conversion, and therefore new infection, has occurred.

In contact tracing of HCWs:

- a. anxiety and unfounded fears are just as common even though HCWs may be better educated in respect to TB, so clear and prompt communication is essential;
- b. publicity and media attention are possible and should be prepared for, including informing senior health executives; and

- c. maintaining the confidentiality of the identity and medical record of the index case and HCWs affected is essential. While these considerations are important in all contact tracing, healthcare work settings have additional challenges regarding medical record accessibility, and special care should be taken.

### **Routine Recurrent Screening**

In some contexts, the pre-employment screening test for LTBI can be repeated at pre-determined routine intervals that are not dictated by episodes of exposure. The aim of this recurrent or serial testing is to detect conversion that would have otherwise been unrecognized. As the risk of unrecognized TB exposure in Victorian hospitals is low, recurrent screening is not recommended for most HCWs. It should be considered in a HCW with a negative pre-employment test that works in an area of high potential risk of exposure to TB. These occupations will be specified at a facility level, but may include workers in TB clinics, mycobacterial laboratories, bronchoscopy and induced sputum suites, and mortuaries. Ideally, data from local contexts will be used in evaluating whether sufficient risk of unrecognized transmission exists. Where indicated, the interval period for recurrent screening is usually, but arbitrarily, set at one year.

Serial testing should use the same test for LTBI used at baseline screening (TST or IGRA) so that conversion, indicating recent infection, can be appropriately recognized. The previously mentioned concerns around the definition of conversion in an IGRA should be borne in mind. A positive result, indicating conversion, should prompt a recommendation of preventive therapy. If a HCW declines preventive therapy after a serial LTBI test is positive, the follow up periodic clinical review and chest x-ray described above is more strongly indicated, because of the higher risk of reactivation after recent infection. HCWs that work in these high risk areas and have a positive pre-employment screening test can be

considered for chest x-ray and clinical review. The interval period for recurrent screening is usually also annual.

### **Active TB in HCWs**

HCWs diagnosed with active TB are managed as for other cases of active TB. Ensure that:

- d. informed consent is obtained from the HCW before information about the diagnosis is disclosed to the employer; and
- e. if pulmonary TB is diagnosed, the HCW should be excluded from work until the treating physician has determined that adequate treatment has been taken to ensure the HCW is no longer infectious.

In respect to this, additional caution may be required if the HCW works with vulnerable patients e.g. the immunocompromised or children.

### **Surveillance**

Monitoring of recurrent screening test conversions and the incidence of active TB in HCWs in a health care facility can be important indicators of TB transmission risk and adequacy of infection control practice. In a HCW with active TB, identifying nosocomial transmission (HCW to patient or vice-a-versa) by analysis of genetic typing of the TB isolates is particularly important, and is actively monitored by the Victorian Tuberculosis Program.

### **BCG Vaccination**

BCG vaccination is not routinely recommended for HCWs in Victoria. BCG vaccination can occasionally be considered in HCWs that are at high risk of exposure to MDR TB e.g. mycobacterial laboratory workers, those going to work in high MDR TB prevalence settings.

### **Education**

In health care settings with a low TB incidence, such as in Victoria, experience with TB is often limited, but an enhanced awareness of the risks of infection transmission and sentinel symptoms is important. A program of regular education of

HCWs is intended to ensure early detection of cases, appropriate infection control practices and early presentation for diagnosis if the HCW has symptoms suspicious of TB. Emphasis should be on the fact that the most effective way to control TB is early detection and commencement of treatment.

### **Further reading**

Stock D et al, for the National Tuberculosis Advisory Committee. National position statement for the management of latent tuberculosis infection. *Comm Dis Int*, 2017;41(3):e204-208.

Waring J et al, for the National Tuberculosis Advisory Committee. Management of tuberculosis risk in healthcare workers in Australia. *Comm Dis Int*, 2017;41(3):e199-203.

Baassano I, Nunn P, Williams B, et al. Tuberculosis among health care workers. *Emerg Inf Dis*, 2011; 17:488-494.

Stuart RL, Bennett N, Forbes A et al. Assessing the risk of tuberculosis infection among healthcare workers: The Melbourne Mantoux Study. *Med J Aust*, 2001;174:569-73.