Guidelines for Tuberculosis Screening of Healthcare Students in the greater Auckland region

Auckland Regional Public Health Service
2013
Foreword

In the New Zealand Ministry of Health document *Guidelines for Tuberculosis Control in New Zealand 2010*, attention is drawn to the need to monitor healthcare workers for tuberculosis (TB) infection during their working lifetime (see Chapter 12, pages 224-226, *Guidelines for Tuberculosis Control in New Zealand 2010*, available at [www.moh.govt.nz](http://www.moh.govt.nz)). It is important to establish healthcare students’ baseline TB infection status before they are placed at risk of exposure to patients with infectious TB, and also to exclude the rare instances of active pulmonary TB in students before patients are placed at risk of exposure to those students. TB screening of healthcare students protects both the students and their patients.

The aim of this document is to provide a standardised approach to TB risk assessment and screening of healthcare students throughout the Auckland region. This document will be reviewed and updated as necessary, in accordance with any changes to future versions of the Ministry of Health tuberculosis guidelines.

This document supersedes the 2008 *Guidelines for Tuberculosis Screening of Healthcare Students* and provides recommended guidelines for the TB screening of student healthcare workers prior to clinical placement. The guidelines are based around the use of the QuantIFERON-TB Gold test, which has largely replaced the Mantoux test in the pre-employment screening of healthcare workers in New Zealand. The QuantIFERON-TB Gold test is the only interferon gamma release assay (IGRA) currently available in New Zealand.

As part of the screening process, all healthcare students should receive information regarding the natural history of TB disease and the testing process. Screening involves completion of a standard TB risk assessment questionnaire and appropriate investigations.

Citation

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# Table of Contents

**ACKNOWLEDGEMENTS**

1. **INTRODUCTION**

2. **MANAGEMENT OF TB SCREENING IN HEALTHCARE STUDENTS**
   - 2.1. Educational Information about TB
   - 2.2. TB Questionnaire & Consent Form
   - 2.3. Clinician at institution makes preliminary decisions from information on the questionnaire and consent form
     - 2.3.1. Students reporting symptoms of tuberculosis
     - 2.3.2. All other students

3. **INTERFERON GAMMA RELEASE ASSAY (IGRA)**
   - 3.1. General Information about IGRA
   - 3.2. Types of IGRA tests
   - 3.3. Interpreting QuantiFERON-TB Gold results

4. **NOTIFICATION**

5. **DATA STORAGE BY INSTITUTIONS**

APPENDIX 1: WRITTEN INFORMATION FOR STUDENTS

APPENDIX 2: TB QUESTIONNAIRE FOR RISK ASSESSMENT OF HEALTHCARE STUDENTS & CONSENT FOR TESTING

APPENDIX 3: LETTER FOR GPS REGARDING TB SCREENING

APPENDIX 4: LOW TB-INCIDENCE COUNTRIES

APPENDIX 5: LETTER FOR STUDENTS WITH LTBI

APPENDIX 5: CLEARANCE LETTER FOR CLINICAL PLACEMENT
1. Introduction

These guidelines are for TB risk assessment and screening of healthcare students and should be used in conjunction with the Ministry of Health's publication *Guidelines for Tuberculosis Control in New Zealand 2010*.

The aim of these guidelines is to provide a standardised approach to TB risk assessment and screening of healthcare students throughout the Auckland region.

2. Management of TB Screening in Healthcare Students

The following procedure is recommended when screening healthcare students for TB (which is undertaken alongside screening for other diseases) prior to clinical placement.

2.1. Educational Information about TB

The programme and its rationale should be explained to all students. This can be achieved by providing written information. A sample information sheet is provided in Appendix 1.

2.2. TB Questionnaire & Consent Form

The TB questionnaire (used to risk assess students) and the consent form (see Appendix 2) should be explained by staff and completed by all students.

2.3. Clinician at institution makes preliminary decisions from information on the questionnaire and consent form

A clinician at the institution should review all consent forms and TB questionnaires. Some institutions delegate this task to the students' GPs.

2.3.1. Students reporting symptoms of TB

If a student reports symptoms of TB, they should be assessed without delay by a clinician at the institution or by a GP. A chest x-ray and at least two early morning TB sputum specimens should be requested if the chest x-ray is abnormal. Liver function tests (LFTs), full blood count (FBC), ESR and mid-stream urine (MSU) should also be undertaken if considered immediately necessary; otherwise these will be done once the student is seen by a specialist. Symptomatic students should be referred to the Respiratory service based at Greenlane Clinical Centre (if the symptoms and chest x-ray are suspicious for pulmonary TB) or the relevant DHB Infectious Diseases service (if symptoms are suspicious for extrapulmonary TB, or another indication for referral is present such as co-existing HIV or other severe immune compromising condition).

2.3.2. All other students

Students who do not report symptoms of TB and do not have a history of previous TB disease or infection should receive a QuantiFERON-TB Gold screening test for TB infection. Some institutions may refer the student to their GP for testing with a covering letter to explain the screening process (see Appendix 3).
Figure 1 - Management of TB Screening of Healthcare Students – Flow Diagram

Provision of written information about TB screening followed by completion of TB questionnaire and consent form for all healthcare students

Clinician at the institution reviews all questionnaires

Does the student have symptoms of TB?

Yes

Clinical assessment of student, chest x-ray, TB sputum, blood tests, and MSU and referral to Respiratory or Infectious Diseases services as appropriate (managed by clinician at the institution or GP)

No

Student referred for QuantiFERON-TB Gold test (laboratory form given by institution or student referred to GP with a covering letter)

QuantiFERON-TB Gold test result?

Positive or Indeterminate*

Clearance letter for clinical placement issued. No further follow-up required.

Negative

Likely false positive or clinically insignificant QuantiFERON-TB Gold result. Student is informed of result and reassured by the health professional requesting the test and issued with a clearance letter for clinical placement. No further follow-up required.

* If result is indeterminate and a definite test result is required by the institution (i.e. positive or negative), consider a two-step Mantoux test (especially if the indeterminate result is due to a negative or low mitogen response).

** Medium or high TB incidence countries are those not considered by Immigration New Zealand to be low TB incidence countries (see Appendix 4)

***Students are at high risk of progression from LTBI to active TB disease if they have any of the following risk factors: likely acquisition of LTBI (i.e. exposed to an infectious TB case) within the last two years, HIV positive, diabetes, alcoholism, drug addiction, immunosuppressive diseases (leukaemia, lymphoma and end-stage renal disease), immunosuppressive treatments (oral steroid therapy, anti TNF alpha therapy, some cancer chemotherapy, transplant anti-rejection drugs), silicosis, gastrectomy, intestinal bypass and chronic malabsorption syndromes.
3. Interferon Gamma Release Assay (IGRA)

3.1. General Information about IGRA

Interferon gamma release assays (IGRA) are blood tests that were developed as an alternative to Mantoux testing for use as part of the diagnostic work-up for active TB disease, and for screening for latent TB infection (LTBI). These assays are based on the principle that the T-cells of an individual sensitised to mycobacterial antigens (TB bacterial antigens) produce interferon gamma (IFNγ) when the antigens are re-encountered. The production of IFNγ by lymphocytes correlates with TB infection.

The main advantages of IGRA compared with Mantoux are that IGRA results are less affected by BCG vaccination, and are also more specific for exposure to \textit{M. tuberculosis} infection (infection caused by the TB bacteria). In other words, there are less ‘false positive’ reactions. Some positive Mantoux tests can be caused by previous BCG vaccination or by infection with non-tuberculous mycobacteria (bacteria that are in the same family as TB, but are not TB).

3.2. Types of IGRA tests

There are two different IGRA tests:

- The QuantiFERON-TB Gold test, produced by Cellestis (a QIAGEN company). This test was approved by the U.S. Food and Drug Administration (FDA) in 2005 and is in use in many countries.
- The TSpot-TB test (TSpot) is produced by Oxford Immunotec (UK), and is also widely used internationally.

The QuantiFERON-TB Gold test is the only IGRA currently available in New Zealand. In New Zealand, the QuantiFERON-TB Gold test is currently analysed by the community laboratory services provider Labtests in Auckland as well as by the three Auckland region DHB laboratories.

The QuantiFERON-TB Gold test is not a funded test in New Zealand (i.e. is not free of charge to the patient), and therefore students or tertiary institutions currently pay the cost of having the test at the community laboratory, Labtests.

3.3. Interpreting QuantiFERON-TB Gold results

The results of the QuantiFERON-TB Gold should not be relied upon for people with symptoms of TB, as a person with active TB disease may have a negative QuantiFERON-TB Gold result. Healthcare students with TB symptoms require urgent clinical assessment as per the flow chart in Figure 1.

The results of a QuantiFERON-TB Gold test in a person without symptoms of TB can be negative, positive or indeterminate, and should be interpreted as follows:

- A negative result in a healthy, immune competent individual with no symptoms of active TB disease suggests that \textit{M. tuberculosis} infection is unlikely.
- A negative result in an immunocompromised individual may be a false negative.
- A positive result in a student with previous TB exposure noted on the TB questionnaire (including residence in medium or high TB-incidence countries) suggests that \textit{M. tuberculosis} infection is likely. A positive result does not distinguish between recently
acquired LTBI and LTBI acquired more historically, or between LTBI and active TB disease. However, as with any test, false positive results can occur.

- A positive or indeterminate QuantiFERON-TB Gold test result in a healthy, immune competent student without likely TB exposure noted on the TB questionnaire is likely to be a false positive or a clinically insignificant result. The student should be reassured that the result is unlikely to be associated with LTBI and a clearance letter for clinical placement (see Appendix 5) should be issued to the student. No further follow-up is required.

- An indeterminate result means that \textit{M. tuberculosis} infection can neither be excluded nor confirmed. Indeterminate results can occur in immunocompromised individuals, or may be due to errors in performing the test/sample mishandling (i.e. laboratory errors). In a small proportion of healthy and immune competent individuals, an indeterminate result may be due to a negative or low mitogen response – in these individuals, a repeat QuantiFERON-TB Gold test is also quite likely to be indeterminate. If a definite test result is required by the institution (i.e. positive or negative), a two-step Mantoux test should be considered and may be less expensive for the student.

For further information, see www.quantiferon.com – FAQs for health professionals

Students with likely TB exposure noted on the TB questionnaire (including residence in medium or high TB-incidence countries) and a positive or indeterminate QuantiFERON-TB Gold test result should have a chest x-ray organised if one has not been done within the last three months. If the chest x-ray shows changes consistent with current or previous active pulmonary TB disease, then the student should be referred promptly to a respiratory physician. If the chest x-ray is normal i.e. does not show evidence of current or old TB disease, then the student is likely to have latent TB infection (LTBI).

Students are at high risk of progression from LTBI to active TB disease if they have any of the following risk factors: likely acquisition of LTBI (i.e. exposed to an infectious TB case) within the last two years, HIV positive, diabetes, alcoholism, drug addiction, immunosuppressive diseases (leukaemia, lymphoma and end-stage renal disease), immunosuppressive treatments (oral steroid therapy, anti TNF alpha therapy, some cancer chemotherapy, transplant anti-rejection drugs), silicosis, gastrectomy, intestinal bypass and chronic malabsorption syndromes.

Students with LTBI who are at \textbf{high risk} of progression to active TB should be informed of their results and referred to Infectious Diseases or Respiratory Services for consideration of LTBI treatment.

Students with LTBI who are at \textbf{low risk} of progression to active TB disease should be informed of their results and provided with written information regarding LTBI (see Appendix 5) and issued with a letter clearing them for clinical placement (see Appendix 6).
4. Notification

In contrast to active TB disease, LTBI is not a notifiable disease under the TB Act 1948. However, students taking medication for treatment of LTBI (whether prescribed in New Zealand or overseas) can be notified to Auckland Regional Public Health Service with the permission of the student. When appropriate, the Respiratory or Infectious Diseases Services would commence healthcare students on treatment for LTBI and be responsible for notifications. TB medications (including LTBI medications) are only funded in New Zealand i.e. are only free of charge to the patient, if the prescription is written by a specialist.

5. Data Storage by Institutions

All tertiary institutions should keep easily accessible records of all students’ TB risk assessments, screening information and test results for at least 10 years. These may be requested in the future by the Occupational Health Service at an employing hospital, or by a doctor, if the student is later exposed to a case of tuberculosis.

Tertiary institutions should give students a copy of their screening information and students should be encouraged to keep it in a safe place for future reference.
Appendix 1: Written information for students

Information about tuberculosis screening for healthcare students

Tuberculosis (TB) is the disease caused by the bacteria called *Mycobacterium tuberculosis*. It is important to establish your baseline TB infection status before you are placed at possible risk of exposure to patients with infectious TB during your clinical placement, and also to ensure (although it is very unlikely) that you don’t have active pulmonary TB that would put your patients at risk. TB screening of healthcare students protects both you and the patients that you come into contact with.

The Health Practitioners Competence Assurance Act 2003 requires that health practitioners (including healthcare students) are competent and fit to practise their professions. Fitness to practise your profession includes not risking infecting patients. Healthcare students are expected to meet the same standards as qualified health practitioners. Therefore, screening for TB and other infectious diseases is required for healthcare students prior to starting clinical work (as is the case for fully qualified health practitioners).

The TB screening involves filling in a TB questionnaire and getting some tests done. It is essential that you answer each question honestly when you fill in the questionnaire. Get the tests done as soon as possible. You will not be able to go on clinical placement until you have filled in the questionnaire, have had the tests done and have been cleared to go on clinical placement.

The QuantiFERON-TB Gold test

The usual test for infection with TB bacteria is the QuantiFERON-TB Gold test which is a blood test used to help diagnose TB infection.

A negative result in a healthy person who has not been exposed to TB suggests that you are unlikely to have TB infection. A positive test result or an indeterminate test result may mean you have TB infection. However, a positive result could be a ‘false positive’ or a clinically insignificant result (because no test is 100% accurate). The doctor organising the QuantiFERON-TB Gold test will decide if you need further tests or if you need to see a specialist.

If your test for infection with TB bacteria is positive or indeterminate (and in some circumstances even if it is negative), you may need to have a chest x-ray and other tests. The chest x-ray is to check if you have active TB disease in your lungs, which may be infectious to other people. If you are found to have active TB disease, you will be referred for appropriate treatment.

What is latent TB infection (LTBI)?

In most people who breathe in TB bacteria and become infected, the body is able to fight the bacteria to stop them from growing. The bacteria become inactive, but they remain alive in the body and can become active later. This is called latent TB infection (LTBI). People with LTBI:

- Have no symptoms
- Don’t feel sick
- Can’t spread TB to others
- Usually have a positive QuantiFERON-TB Gold test

Most people (9 out of 10) who have LTBI will never develop active TB disease. In these people, the TB bacteria remain inactive for a lifetime without causing disease. But in other people, especially people who have weak immune systems, the bacteria can become active and cause TB disease.
What is active TB disease?

Some people with LTBI develop active TB disease later in life. TB bacteria usually cause disease in the lungs. But TB bacteria can cause disease in any part of the body such as the lymph nodes, kidney, spine and brain. If not treated properly, TB disease can be fatal. TB is spread through the air from one person to another. TB is only infectious to others when it is in the lungs or throat (pulmonary or laryngeal TB). The bacteria get into the air when a person with active TB disease of the lungs or throat coughs or sneezes. People nearby may breathe in these TB bacteria and become infected. However it is quite difficult to catch TB – close exposure to a person with TB in the lungs, over a long period of time, is usually needed for someone to be infected.

The symptoms of active TB disease include:

- Coughing lasting for 3 weeks or longer
- Coughing up blood or bloody sputum (phlegm)
- Fever
- Night sweats
- Loss of appetite
- Unexplained weight loss
- Fatigue (feeling tired or weak all the time)
- Other symptoms (like enlarged glands)
Appendix 2: TB questionnaire for risk assessment of health care students & consent for testing

**General Information**

Surname: _________________________ First Names: ______________________

Address: __________________________________________ ______________________
___________________________________________________ _____________________

D.O.B: _____ / _____ / __________  Sex:   Male ☐   Female ☐

Name of GP: _______________________________________ ______________________

Address of GP: ____________________________________ _______________________
___________________________________________________ ______________________

**Baseline Personal Tuberculosis Information**

1. What country were you born in? ______________________

2. Ethnicity (please choose all that apply)
   - ☐ NZ European  ☐ NZ Maori  ☐ Pacific Island  ☐ Other European
   - ☐ Other (please state) ______________________________ ___________________

3. Please list the countries you have lived in for more than 3 months for within the past 5 years.
   __________________________________________________
   __________________________________________________
   __________________________________________________

4. What date did you arrive in New Zealand? __________ N/A ☐

5. Do you have or have you had a chronic illness such as HIV, kidney disease, diabetes, cancer, any immunosuppressive illness or immunosuppressive treatment? *
   - Yes ☐  No ☐

   * Please talk to the doctor or nurse if you are unsure about how to answer this question. Key risk factors for HIV include: anal intercourse with an HIV-infected person without using a condom; vaginal intercourse with an HIV-infected person without using a condom; using shared needles or syringes or injecting equipment during IV drug use; transmitted by an HIV positive mother to her baby during pregnancy, birth or breastfeeding. Immunosuppressive diseases include leukaemia and lymphoma. Immunosuppressive treatments include long-term oral steroid therapy (not asthma inhalers), anti TNF alpha therapy, some cancer chemotherapy and transplant anti-rejection drugs. Other relevant conditions include diabetes, end-stage renal disease, alcoholism, drug addiction, silicosis, gastrectomy, intestinal bypass and chronic malabsorption syndromes.
6. Do you take any oral steroids, immunosuppressive therapy (not including inhaled steroids) or other medication? 
   Yes □ No □
   If yes, please list ______________________________ ________________________

7. Have you ever been treated for tuberculosis? 
   Yes □ No □
   If yes, when______________________________________ ____________________

8. Have you ever been exposed to anyone with TB? Yes □ No □ Don’t know □
   If yes, when___________________________________________________________

9. Have you had any previous exposure to TB in the course of your work? Yes □ No □ Don’t know □
   If yes, when___________________________________________________________

10. Have you ever been vaccinated with BCG? Yes □ No □ Don’t know □
    If yes, when___________________________________________________________
    If yes, has it left a scar? (doctor/nurse to verify) Yes □ No □

11. Are you pregnant? N/A □ Yes □ No □ Don’t know □

12. Have you ever had a Mantoux test, heaf test or blood test for TB infection? Yes □ No □ Don’t know □
    If yes, what was the result? ____________________________
    (in mm for Mantoux; positive, negative or indeterminate for IGRA)

13. Have you ever been told that you should not have any more Mantoux tests because you have had a positive Mantoux reading? Yes □ No □ Don’t know □

14. Have you had a chest x-ray in the last 2 years? Yes □ No □ Don’t know □
    If yes, what was the result? Normal □ Abnormal □
    Please provide details if available ________________________________
    (place and date x-ray taken, x-ray report and/or x-ray)

15. Do you have as much energy as you think you should have for your age? (circle)
    0 No energy 1 2 3 4 5 Lots of energy

16. Does your cough produce a lot of sputum (phlegm)? Yes □ No □
17. Do you have a persistent cough, or cough most days?  
   Yes ☐  No ☐

18. Have you ever coughed up blood or bloody sputum?  
   Yes ☐  No ☐

19. Do you wake at night sweating so much you have to change your bed clothes?  
   Yes ☐  No ☐

20. Have you had urinary tract infections without your doctor being able to find a cause?  
   Yes ☐  No ☐

21. Have you lost any weight over the last 6 months without meaning to?  
   Yes ☐  No ☐
   If yes, how much? ________(kg)

22. Have you had any lumps in your neck, armpit or groin which won’t go away?  
   Yes ☐  No ☐

**Declaration**

I ________________________________ (full name) declare that to the best of my knowledge the answers in this questionnaire are correct. I understand that if I have given any false or deliberately misleading information, or I have deliberately omitted any relevant facts, this may lead to serious consequences. I may be subject to disciplinary action which may affect my ability to continue my course of study at this institution.

Signed ________________________________   Date __________________

**Consent**

- I have received a fact sheet about Tuberculosis (TB) screening and the QuantiFERON-TB Gold test.
- I have been given the opportunity to ask questions about the QuantiFERON-TB Gold test. Any questions asked have been answered to my satisfaction.
- I have answered the questions in the TB Questionnaire for Risk Assessment of Healthcare Students.
- I understand the details of the QuantiFERON-TB Gold test and I consent to the administration of the QuantiFERON-TB Gold test.

Full Name (please print) __________________________ ___________________________

Signed ________________________________   Date __________________
Clinician Assessment
Assessed by ___________________________  Date assessed ______________________

QuantiFERON-TB Gold

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<thead>
<tr>
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<th>QuantiFERON-TB Gold</th>
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<tr>
<td>Date blood taken</td>
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<tr>
<td>Result</td>
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<td>Date result reviewed</td>
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<td>Name (print)</td>
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Referred to Infectious Diseases Service?  Yes ☐  No ☐
Referred to Respiratory Service?  Yes ☐  No ☐
Appendix 3: Letter for GPs regarding TB screening

[Date]

TO WHOM IT MAY CONCERN
Re: [Student Full Name]

[Student’s first name] is a healthcare student at [department and name of institution]. Prior to clinical placement, he/she needs to complete health screening which includes a QuantiFERON-TB Gold test.

Guidelines for Tuberculosis Screening of Healthcare students are available on the Auckland Regional Public Health Service website (http://www.arphs.govt.nz/health-information/communicable-disease/tuberculosis).

The result of the QuantiFERON-TB Gold test may be negative, indeterminate or positive. A negative test in the absence of tuberculosis symptoms means that tuberculosis infection is extremely unlikely and no further follow-up is required. A template for a letter clearing the student for clinical placement is available in Appendix 6 of the Guidelines. If the QuantiFERON-TB Gold test result is positive or indeterminate, then please refer to the flow chart contained in the Guidelines for guidance regarding further management.

Kind regards,
[Name of contact person at the department]
[Department and name of institution]
[Contact details]
Appendix 4: Low TB-incidence countries

Immigration New Zealand considers the following countries to be low TB incidence countries:

<table>
<thead>
<tr>
<th>COUNTRIES, AREAS, AND TERRITORIES WITH A LOW INCIDENCE OF TUBERCULOSIS (TB)</th>
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<tr>
<td>American Samoa</td>
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<td>Andorra</td>
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<td>Ireland</td>
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<td>Israel (including the Occupied Palestinian Territory and including East Jerusalem)</td>
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<td>Italy</td>
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Appendix 5: Letter for students with LTBI

Dear STUDENT NAME

Prior to your clinical placement as a healthcare student, you recently completed screening, including screening for tuberculosis (TB). As a result of the screening, you have been found to have latent TB infection (LTBI).

This is a letter for you to keep so that you have a permanent record of your screening results. I strongly recommend that you give a copy of this letter to your family doctor. (DELETE IF NOT APPLICABLE)

Relevant test results:
Your QuantiFERON-TB Gold test result on DATE was RESULT positive/negative/indeterminate.
Your chest x-ray result on DATE was normal/abnormal.
NOTE ANY ABNORMALITIES AND ADVISE IF GP FOLLOW UP REQUIRED

Your test results indicate that you have LTBI.

You do not have active TB disease, and you are not infectious – you cannot pass the infection on to anyone else. You can continue with all your work and social activities as normal.

LTBI means that you have been infected with TB bacteria (germs) at some stage in the past. The TB bacteria are in your body, but are dormant (asleep) and inactive. Your body is mounting a response to the bacteria. The bacteria can stay in your body for many years without causing problems. It is most likely that you will never develop active TB disease.

However you have a small risk (around 10% during your lifetime) of developing active TB disease at some time in the future. This is more likely to happen if you develop a weakened immune system or as you get older (because the immune system weakens as people age).

To reduce the chance of developing active TB disease in the future you should follow a healthy lifestyle: don’t smoke, exercise regularly, eat a good diet, drink alcohol in moderation (if at all), and get enough rest.

Conditions or treatments that make it more likely that active TB disease will develop include: HIV, kidney disease (renal failure), diabetes, gastrectomy, cancer, chemotherapy medicines for cancer, large doses of oral steroid medication, old age, alcoholism and any other condition that weakens your immune system.

You must be always be aware of and watch out for symptoms of TB disease:

- Coughing lasting for 3 weeks or longer
- Coughing up blood or bloody sputum (phlegm)
- Fever
- Night sweats
- Loss of appetite
- Unexplained weight loss
- Fatigue (feeling tired or weak all the time)
- Other symptoms (like enlarged glands)

If you develop any of these symptoms you must be checked without delay by your family doctor. Make sure you tell your doctor that you have LTBI, or even better, show the doctor this letter.

Remember that if you do develop active TB disease and are infectious (if the TB is in the lungs or throat), you will first infect those you spend the most time with (usually family and friends, especially young children). However your patients (who are already sick) and colleagues may also be infected. So it is very important to be checked by a doctor without delay if you develop symptoms of TB disease.

If you start work in the healthcare sector, you should tell the Occupational Health Service at your workplace about your LTBI. They will advise whether any ongoing surveillance is required.
Appendix 6: Clearance letter for clinical placement

[Date]

TO WHOM IT MAY CONCERN
Re: [Student Name]

I reviewed the TB questionnaire risk assessment form, the QuantiFERON-TB Gold result, and other relevant investigations.

For this student:
☐ Latent tuberculosis infection (LTBI) is unlikely
☐ Latent tuberculosis infection (LTBI) is present but poses no clinical risk to staff or patients

He/she is cleared for clinical placement.

He/She:

☐ Needs no further follow up
☐ Will be followed up as required

Kind regards,
[Medical Practitioner’s name and qualifications].
[Contact details of medical practitioner]