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Guidelines for Medical Assessors: Non Tuberculosis Mycobacterium

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PURPOSE OF THIS DOCUMENT

This document provides information to assist with testing for Non Tuberculous Mycobacterium (NTM) and identifying Non Tuberculous Mycobacterium Pulmonary Disease (NTM-PD), which is on the list of conditions in A4.1.10 of Immigration Instructions. It also offers guidance about requesting further information to assist in assessing the health of visa applicants with suspected NTM.

A4.1 Acceptable standard of health (applicants for residence)

BACKGROUND

It is essential that visa applicants with active NTM-PD are identified. This disease is considered to be high cost due to:

- the type of treatments
- length of treatment usually required, and
- the high risk of active disease recurring.

Rates of NTM lung infection (colonisation and active disease) vary considerably between countries, but are generally considered to have been increasing in prevalence over the past 40 years. Recent studies in the UK have shown that around six per 100,000 sputum cultures are now positive for NTM.[2] A study in Canada has reported a prevalence of active NTM-PD of 41 per 100,000 cases.[2] This is thought to be secondary to increased:

- environmental exposure through home hot water systems
- long term antibiotic usage in inflammatory lung diseases
- use of medications which can impair immunity, and
- person-to-person transmission.[2]

ABOUT NTM

Non Tuberculous Mycobacterium (NTM), also known as Mycobacteria other than tuberculosis (MOTT) and Atypical Mycobacterium, are naturally occurring bacteria found in soil and water, including treated drinking water distributions systems. There are over 170 different known NTM species and more are constantly being discovered.

NTM bacteria are part of the Mycobacterium Genus (family), along with Mycobacterium Tuberculosis (M.TB) and Mycobacterium Leprae (Leprosy). However NTM is slightly different to TB and Leprosy, in that it does not always cause active disease and can simply be present as a colonising agent.

Risk factors for active NTM-PD

Risk factors for active NTM-PD include:

- increased exposure – for example, swimming, gardening or bathing in hot tubs

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- pre-existing lung disease such as asthma, COPD, Alpha-1 antitrypsin deficiency, Cystic Fibrosis, bronchiectasis or ABPA
- Lady Windermere Syndrome – white, postmenopausal, thin, tall, pectus excavatum and mitral valve prolapse
- other co-morbidities including GORD, Rheumatoid Arthritis, Vitamin D deficiency, low BMI and malnutrition
- immunodeficiency – inherited and acquired, in particular through HIV-AIDS
- immunosuppressive medications, including inhaled corticosteroids, transplant and chemotherapy medications
- use of azithromycin and PPI.

DIAGNOSIS OF NTM AND ACTIVE NTM-PD

It is essential to identify a false positive result for NTM indicating contamination, versus NTM colonisation, versus active NTM-PD.

Widespread exposure to NTM from the environment can contaminate sputum samples and create false positive results, for example through transient presence in the pharynx or upper airway at the time of sputum samples. In this scenario, a repeat sputum sample taken with appropriate technique should be negative.

NTM 'colonisation' is where NTM is identified as being chronically present in the lungs, but is not causing active pulmonary disease.

Active NTM disease can affect the lungs, sinuses, lymph nodes, joints and CNS, and also present as disseminated disease. NTM most commonly affects the lungs, causing progressive inflammatory lung damage – active NTM-PD.

Active NTM-PD can present as:

- a cavitating lesion that is:
  - often mistaken for M.TB or malignancy
  - most common in current or ex-smokers
  - often sputum smear positive
- a nodular-bronchiectatic abnormality – this is most common in women with no previous lung disease.

Some NTM species are known to be more likely to cause active NTM-PD, including:

- M. Avium Complex (MAC) (M.avium, M.intracellulare, M.chimaera subspecies)
- M. Kansasii
- M. Abscessus (including M.a.abscessus, M.a.massiliense, M.s.bolletti subspecies)
- M. Chelonae
- M. Fortuitum
- M. Malmoense
- M. Xenopi.

Other NTM species are rarely pathogenic and usually represent contamination of the sputum sample – for example M. Gordonae.

Note
Correct species identification of NTM isolates is clinically important since NTM species differ in their potential to cause clinical disease in humans and in their response to specific antibiotics. However, not all countries are able to undertake specific species testing in their laboratories.

Recommended diagnostic criteria for NTM-PD

Clinical, radiological and microbiological criteria need to be considered when diagnosing Active NTM Disease.

Notes
A single NTM isolate from sputum, which is not isolated again on repeated culture, is usually of no clinical relevance.

Individuals with two or more isolates of the same NTM species from repeated sputum cultures are more likely to develop radiological evidence of Active NTM-PD disease.

Clinical criteria

After other potential causes of symptoms are excluded, the symptoms will be:

- pulmonary, such as cough, sputum production, hemoptysis, chest pain or dyspnea, and/or
- systemic, such as fatigue, weight loss or fever.

Progressive symptoms increase the likelihood of NTM-PD, so that antimicrobial drug therapy may be necessary.

Radiological criteria

In a chest X-ray, nodular, ill-defined or cavitary opacities will be visible. In a chest CT scan there will be bronchiectasis with multiple small nodules, including:

- tree-in-bud or centri-lobular nodules
- lung cavitation, or
- air space disease (consolidation or ground glass opacification).

Microbiological criteria

Tests will show one of the following:

- positive culture results from at least two separate sputum samples
- positive culture results from at least one bronchial wash or lavage
- transbronchial or other lung biopsy
    - with mycobacterial histopathologic features (granulomatous inflammation or acid-fast bacilli (AFB)) and positive culture for NTM, or

- mycobacterial histopathologic features (granulomatous inflammation or AFB) and one or more sputum or bronchial washings that are culture positive for NTM.

TREATMENT OF ACTIVE NTM-PD

Antibiotic treatment requires multiple drugs and prolonged therapy (at least one year of treatment, but often two or more years of treatment) as well as careful monitoring of toxicity against the benefits. Treatment therefore usually requires close supervision by a respiratory specialist.

NTM-PD therapy is often not curative, with high recurrence rates and some individuals require ongoing, lifelong follow-up.

Infected individuals pose minimal risk to others and isolation precautions are not usually required. The exception would be if the person with active NTM-PD was in frequent contact with a person at high risk of infection – for example, a family member with cystic fibrosis.

ASSESSING NTM FOR ASH REQUIREMENTS

You need further information if an applicant's IME shows:

- cultures reported as positive for any species type of NTM
- a history of active NTM disease
- current active NTM disease, or
- any comments about suspected NTM disease.

Making further information requests (FIRs) to applicants with NTM or NTM-PD

If there is any history, comment or a positive NTM sputum result from the IME make a FIR for:

- x3 new sputum samples for smears plus sample to be cultured over six to eight weeks – these are required for specific assessment of the applicant's positive NTM result
- the NTM species type, if it can be provided
- a new CXR and report.

Use the FIR heading, "Chest clinic for active TB" when requesting information about NTM. This allows you to report under a single FIR heading for a specialist review, sputum results and a new CXR image.

Note
There are many countries that are not able to test for the NTM species type. If the specialist's report states this cannot be provided, we must accept that.

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Outcomes following the initial FIR

- If the testing shows negative cultures, but your review of the chest X-ray shows more than minor abnormalities, refer to our INZ RP for an assessment.
- If the testing shows negative cultures and the CXR is stable then ASH for Residence and AWC for Temp (see below under ASH and AWC outcomes).
- If the testing shows positive cultures, even if the species is not able to be provided, refer to our INZ RP for an assessment and follow the RP's recommendation.
- If an applicant has Active NTM-PD the opinion from the RP may be **NOT ASH.**
- The opinion is particularly likely to be **NOT ASH** if the testing shows positive cultures for any of the following more serious pathogenic NTM species:

M. Avium Complex (MAC)

M. Kansasii

M. Celatum

M. Abscessus

M. Chelonae.

- If the species isn't provided, and if the RP assesses the applicant as having NTM, then your opinion would still likely be NOT ASH. In this case the applicant is assessed as likely NOT ASH because they are likely to impose significant costs or demands on health services. Please note: In your NOT ASH opinion, you can comment on further information that can be provided with a future visa application, including: information about the completion of their treatment for NTM along with updated Chest Clinic reports, and updated imaging (including CXRs and CT scans).

ASH and AWC

The applicant meets ASH requirements for residence or AWC requirements for a temporary visa if:

- the testing shows negative cultures, and
- your review of their chest X-ray shows no, or only minor, abnormalities – a minor abnormality would be some linear opacities in one lobe of the lung, or
- an INZ RP decides that positive cultures showing up in the tests are likely to be a contaminant or a benign colonisation.

For an AWC outcome, please request a new CXR (to confirm stability of any previous minor abnormalities) and any updated Chest Clinic reports available.

REFERENCES

Best practices for Pulmonary Nontuberculous Mycobacteria, Public Health Ontario, June 2017.

Haworth CS et al. British Thoracic Society Guidelines for the management of Non Tuberculous Mycobacterial Pulmonary Disease (NTM-PD). Thorax Vol 72, sup 2. Nov 2017.