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Communicable Disease Control Manual
Chapter 4: Tuberculosis

Appendix B: Infection Prevention and Control

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APPENDIX B: INFECTION PREVENTION AND CONTROL

OVERVIEW

Effective TB infection prevention and control (IPC) within facilities and in the community is contingent on the prompt identification of individuals with signs or symptoms of TB disease and initiation of appropriate measures to interrupt or prevent transmission (1). These measures include airborne precautions and home isolation, prompt and effective treatment, as well as specific guidelines on the collection, handling, transport, and preparation of specimens that could contain TB bacteria (See Appendix C).

This appendix focuses on providing up to date information on initiating and discontinuing airborne and/or home isolation precautions. Readers should consult facility-specific guidelines, policies, and procedures to inform workplace decisions on implementing environmental, administrative, and respiratory protection measures for TB infection prevention and control.

GENERAL PRINCIPLES

Current recommendations on TB IPC involve a hierarchical approach involving three main components (1):

1. **Environmental (engineering) controls:** environmental measures to reduce likelihood of exposure to aerosolized TB bacteria (e.g., mechanical ventilation systems, ultraviolet germicidal irradiation (UVGI), and high-efficiency particulate air (HEPA) filters).

2. **Administrative controls:** institutional policies or measures to provide overarching protection for all health care providers (HCPs), patients, and visitors in a facility.

3. **Personal protection controls:** measures directed to individual HCPs either to protect against infection with TB bacteria (e.g., use of disposable N95 particulate respirators) or to prevent development of TB disease if infected (e.g., employee TB testing programs).

Detailed information on each control type can be found in the Canadian TB Standards (CTS), 8th Ed, Chapter 14 (1). Additionally, the CTS reviews IPC in a variety of health care settings from hospitals to remote clinics, long-term care, and other congregate living environments.

Application of IPC measures to a home environment includes the same principles. Refer to Section 2: Home Isolation.

AIRBORNE PRECAUTIONS

Practice Statement

Airborne precautions, such as hospital or home isolation, involve balancing the rights of the individual against the duty to protect the public, as mandated by the BC Public Health Act (2). In addition to the burden of a serious medical condition, persons diagnosed with infectious TB face substantial psychosocial and economic costs due to isolation. It is the responsibility of the health care team to consider each scenario on an individual basis and implement and discontinue isolation measures in a compassionate, and evidence-based approach to reduce the harm associated with TB isolation.

Airborne precautions refer to multiple measures applied to prevent exposure to TB in both a facility setting and in the community. They include engineering, administrative, and personal protective controls, such as:

- access to isolation rooms in acute care,
- education for HCPs and patients on recognizing TB disease to avoid diagnostic delay,
- policies outlining when to initiate airborne precautions, and
- the appropriate use of respirators and masks.

Identifying people with presumed or confirmed respiratory TB

Airborne precautions should be initiated and maintained for people with infectious forms of TB disease (confirmed and clinical cases) until such time as they meet the criteria for discontinuation of airborne precautions (see Discontinuation of Airborne Precautions).

This includes people being assessed for illness with **any** of the following characteristics:

- Risk factors for TB **and** signs/symptoms of **respiratory** TB disease.
- Chest x-ray (CXR) findings consistent with TB disease (see Section 4a), regardless of whether there are TB signs/symptoms.
- One or more AFB smear-positive sputum specimens.
- Suspected laryngeal involvement (e.g., hoarseness, sore throat).
- Presumed non-respiratory TB disease with any of the following:
    - abnormal CXR findings.

- an open abscess or lesion in which the concentration of organisms is high, especially if drainage is extensive or if aerosolization of drainage fluid is performed.
- normal CXR findings in the presence of immune compromise by disease or treatment.

NOTE: Children under 10 years with TB disease are **not** usually considered infectious. However, airborne precautions should be initiated while a diagnosis is being determined for children **of any age** with any of the following characteristics, **particularly if risk factors** for TB present:

- Cavitary CXR findings
- AFB smear-positive respiratory specimen(s)
- Suspected laryngeal involvement
- Extensive pulmonary infection, with TB risk factors
- Congenital TB and undergoing procedures involving oropharyngeal airway

Practitioner Alert!

- Sputum smear negativity at time of diagnosis **does not** rule out infectious TB and should not be used in isolation to determine infectivity. Almost half of the TB cases in BC are smear negative at diagnosis.
- Repeat sputum smears are recommended at the initiation of treatment to re-confirm smear-negative status and support decision-making around length of isolation.

Use of personal protective equipment (PPE) and airborne infection isolation rooms (AIIR)

Respiratory protection programs include selecting the appropriate respirators for HCPs and ensuring education on their appropriate use.

- HCPs and others (e.g., facility staff, visitors[1]) should wear fit checked, disposable N95 particulate respirators while in shared airspaces with people with infectious TB.

[1] Visitors should be restricted to immediate family, guardians. Visiting family or guardians of pediatric patients should be screened for respiratory TB disease. Visits by children under 5 and those with immune compromise should be discouraged (CTS, 2022). Consult facility policies regarding any precautions visitors should take prior to entering airspaces shared by persons with infectious TB.

Persons with infectious TB **within facilities**:

- Should be placed in an airborne infection isolation room (AIIR). If an AIIR is not available at the facility, the person should wear a surgical-type mask until in an AIIR.
- Persons with infectious TB **are not required** to mask while in an AIIR.

Persons with infectious TB **in the community**:

- **Appointments**: Should wear a surgical-type mask during TB care appointments (e.g., for directly observed treatment) and other essential medical appointments (e.g., for diagnostic evaluations, blood tests), and during transport to and from such appointments.
- **Indoors:** Persons with infectious TB are **not** generally required to mask while inside their place of residence, unless in the presence of a health care provider (who should be wearing an N95). However, people should avoid sharing common indoor airspaces with non-household members or previously unexposed persons and should cover their mouths and noses with tissues when coughing, sneezing, or laughing.
- **Outdoors**: Masking is not usually required, but while outdoors, persons with infectious TB should avoid spending time with non-household members or previously unexposed persons. They should cover their mouths and noses with tissues when coughing, sneezing, or laughing.

HOME ISOLATION

Most people presumed or diagnosed with infectious TB do not require admission to hospital for treatment, rather, they can be cared for in their home. Reducing the risk of TB transmission in this setting may include adherence to the following precautions:

- Remaining in the home.
- Adhering to TB treatment.
- Wearing a surgical-type mask when leaving the home to attend essential medical appointments and when HCPs enter the home.
- Covering their mouths and noses with tissues when coughing, sneezing, or laughing.
- Airing out rooms in the home where they typically spend the most time, for example by opening windows.

- Advising any new HCPs of the TB diagnosis (e.g., emergency room personnel, ambulance paramedics).
- **Not** having visitors to their homes, especially children and those with immune compromise.
- **Not** routinely using buses, trains, or airplanes. A taxi can be used for essential healthcare appointments provided the person is wearing a mask.
- **Not** going to public places, including but not limited to work, school, church, stores, shopping malls, restaurants, or movie theatres.
- **Not** going to non-essential appointments (e.g., dentist, hairdresser).

A HealthLinkBC file on Home Isolation for Tuberculosis (TB) is available in multiple languages for clients.

DISCHARGE OF PERSONS WITH INFECTIOUS TB FROM ACUTE CARE

Successful discharge planning requires careful planning and collaboration between the hospital, public health, the client, and their family. Clients with TB have diverse experiences that may impact their engagement in care. Supporting a smooth transfer of care from hospital to community requires a trauma-informed, culturally safe comprehensive approach. Consider collaboration with BCCDC TB Services (TBS) or Island Health TB Program, the First Nations Health Authority and/or the local Medical Health Officer (MHO).

Practitioner Alert!

Clients being discharged from acute care should be provided with enough TB medication to last until their first appointment in the community with a health care provider (E.g., Public health or TB clinic).

Communication Plan

To support a safe and successful discharge, follow the guidance below for people being discharged from acute care centres (except VGH TB ward and BC Children's Hospital):

- **For clients in the Lower Mainland of Vancouver** ensure that the **TB Nurse Consultants (604-707-5678)** have been notified well in advance of the anticipated discharge date to review the plan of care and ensure a TB clinic appointment is booked.

- **For clients outside of the Lower Mainland of Vancouver**, ensure your local Public Health Unit or FNHA TB Services program (if being discharged to a First Nations community) is aware well in advance of the anticipated discharge date. The recommended timeframe for discharge planning may vary by jurisdiction.

Recommendation: Discharge Planning

In general, a person known or expected to have **fully susceptible TB disease** may be considered for discharge regardless of AFB sputum smear status, provided that **advance arrangements have been made for their treatment to be continued** and properly supported after discharge **and they meet all the following criteria**:

- Tolerating effective TB treatment regimen (e.g. no rash, no vomiting, normal/stable bloodwork).
- Showing clinical improvement (e.g., reduction in fever, reduction of cough).
- Access to stable housing and if indicated, the ability to safely isolate and limit contact with persons at high-risk for TB, such as PLWH and children under 5 years of age. See further details in next recommendation.
- Agree and can adhere to TB treatment, monitoring, and follow-up requirements in the community.
- Agree and can adhere with home isolation requirements until their TB care team recommends home isolation can be safely discontinued.

Recommendation: Home Environment

Complete an assessment of the home environment. Considerations include but are not limited to:

- A person will have access to a stable residence at a verified address. **Note:** This is **not** a congregate setting such as a shelter, nursing home, or single-room-occupancy hotel.
- The household air will **not** be recirculated to other housing units (e.g., certain apartment complexes).
- All household members have been previously exposed to the person. If any household members are TST-negative, they should be informed of and understand potential risks of ongoing exposure before the client returns to the residence. **Note**: Conversion from initial exposure can take 8-12 weeks (window period) and there is a potential for the

definitive TST at the 8 week post-exposure assessment to be a positive result (See Section 8).

- Where a person can safely isolate and limit contact with children under 5 years or other persons who are significantly immune compromised. It is recommended that such household members have been assessed for and/or are receiving window period prophylaxis or the appropriate treatment based on the initial TB assessment. These situations should be discussed in advance of discharge with TBS, Island Health TB and/or the local MHO.

Recommendation: Additional Supports

Complete an assessment of additional supports prior to discharge to facilitate a safe and successful discharge. Considerations include but are not limited to transportation requirements, housing support, disability accommodation, and mental health supports.

NON-ADHERENCE WITH AIRBORNE PRECAUTIONS AND HOME ISOLATION

Non-adherence with airborne precautions and/or home isolation can lead to TB transmission. For patients in acute care, follow internal protocols/policy. When adherence issues occur for people in the community, consult TBS, or Island Health TB and/or the local MHO.

DISCONTINUATION OF AIRBORNE PRECAUTIONS AND HOME ISOLATION

Practice Statement

Recent evidence suggests that the infectiousness of people with pulmonary TB disease **on therapy** is related to the efficacy and duration of TB treatment, and **not** solely sputum smear and culture status (3). Treatment initiation with effective[1] therapy decreases infectiousness within days.

Discontinuation of airborne precautions in **acute care** and other institutional settings should be made in accordance with internal protocols/policies**.** Consultation with TBS, or Island Health TB, or the local MHO is recommended if isolation goes beyond 4 weeks or if DR-TB. Table B-1 outlines recommendations based on guidance in the Canadian TB Standards (3); however, providers may use their clinical discretion to extend isolation in certain circumstances. For example, if a person with infectious TB lives in a congregate setting or with immune suppressed individuals.

Decisions on discontinuation of **home isolation** should be made in consultation with TBS, Island Health TB or the local MHO.

People with Presumed TB

Discontinuation of airborne precautions/home isolation may be considered when three successive sputum specimens (spontaneous or induced) are negative on AFB smear, unless TB disease is still strongly presumed or treatment initiated, or no other diagnosis has been made. In the context of clinical TB (e.g. no culture confirmation), discontinuation of isolation can be considered after 2 weeks of therapy.

Practitioner Alert!

If sputum specimens continue to be culture-positive after 4 months of treatment or if they become culture-positive after a period of negative results, drug susceptibility testing should be repeated (2). Consultation with BCCDC TB Services is recommended.

People with Confirmed Respiratory TB

Table B-1: Recommendations on discontinuation of airborne precautions/home isolation

TB Microbiological Results	Recommendations
AFB **Smear-Negative**, Rifampin-**Susceptible** Pulmonary TB Disease	Discontinuation of airborne precautions/home isolation may be considered when all the following are true: • clinical evidence of improvement, • a minimum of 2 weeks of effective* therapy has been tolerated and completed.
AFB **Smear-Positive**, Rifampin-**Susceptible** Pulmonary TB Disease	Discontinuation of airborne precautions/home isolation may be considered when all the following are true: • clinical evidence of improvement, • a minimum of 2 weeks of effective* therapy has been tolerated and completed, and • there have been a further 3 consecutive AFB-negative sputum-smears. If the above applies but sputum smears remain persistently positive despite 2 weeks of effective therapy, discontinuation of airborne precautions/home isolation may be considered after completing 4 weeks of effective therapy.
Rifampin-**Resistant** Pulmonary TB Disease	Discontinuation of airborne precautions may be considered when all the following are true: • clinical improvement, • 2nd line drug susceptibility test results available, • minimum of 4 weeks of effective 2nd line therapy♦ tolerated and completed, • 3 consecutive AFB negative sputum smears (if initially positive), • case review with TBS. **Consultation with BCCDC TB Services is required in all cases of drug resistant† TB disease or cases on 2nd-line treatment regimens** (1).

* Drug susceptibility test (DST) results confirm effectiveness of the treatment regimen. Phenotypic DST results for 1st-line therapy may be available within 2 to 2.5 weeks from the time the culture is positive. Whole genome sequencing (WGS) antimicrobial resistance predictions can precede phenotypic susceptibility results. In select circumstances, TB providers may consider de-isolation prior to susceptibility results being available (E.g., source case known to be fully sensitive).

♦ Second-line TB treatment for rifampin-resistant TB includes a fluoroquinolone such as moxifloxacin. All isolates with rifampin resistance are sent to the National Microbiology Lab (NML) for extended susceptibility testing. Consult TBS to discuss treatment effectiveness.

†Isolates resistant to 2 or more drugs are routinely sent to the NML for 2nd line susceptibility testing. Clofazamine and bedaquiline require treating physician to make a specific request.

REFERENCES

1. Johnston BL, Ogunremi T, Defalco K, Savard N, Smith SW. Chapter 14: Prevention and control of tuberculosis transmission in healthcare settings. Can J Respir Crit Care Sleep Med [Internet]. 2022 Mar 24;6(sup1):205–28. Available from: https://doi.org/10.1080/24745332.2022.2043677

2. Public Health Act [Internet]. [cited 2024 Oct 22]. Available from: https://www.bclaws.gov.bc.ca/civix/document/id/complete/statreg/00_08028_01

3. Cooper R. Appendix B: De-isolation review and recommendations. Can J Respir Crit Care Sleep Med [Internet]. 2022 Mar 24;6(sup1):248–55. Available from: https://doi.org/10.1080/24745332.2022.2046926