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**Alberta Tuberculosis Control Manual** contact:

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ISBN 0-7785-1550-8
Quantity Printed:  500
Date printed:  May, 2002

Additional Copies of the **Alberta Tuberculosis Control Manual**
are available at the above address or on the internet at www.health.gov.ab.ca

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**Acknowledgements**

The *Alberta TB Manual Committee* would like to thank the many individuals who contributed to the development of this manual. A special thanks to the Provincial Tuberculosis Consultant, the regional Medical Officers of Health, the regional Tuberculosis Coordinators, and the TB Clinic Directors for their input and thorough review of the document.
# TABLE OF CONTENTS

INTRODUCTION .................................................................................................................. 1-1

*Alberta’s Tuberculosis Program* ..................................................................................... 1-5

SCREENING PROGRAMS .................................................................................................... 2-1

*Groups Requiring Screening* ............................................................................................ 2-3

*Screening and Diagnostic Tools* ...................................................................................... 2-5

- History and Symptom Inquiry
- Tuberculin Skin Test
- Precautions and Adverse Reactions
- Sputum Collection For Acid – Fast Bacilli (AFB)

*Screening Guidelines For Continuing Care Facilities* ..................................................... 2-14

- Recommendations for Residents
- Recommendations for Staff and Volunteer Screening
- Algorithm For Continuing Care Client Admission Screening
- Algorithm For Staff Screening

*Screening Guidelines For Acute Care Facilities* ............................................................. 2-19

*Screening In Correctional Institutions And Substance Abuse Rehabilitation Centres* ..... 2-20

- Recommendations for Residents of Correctional Institutions and Rehabilitation Centers
- Employee Screening
- Algorithm For TB Surveillance of New Admissions to Correctional Centres

*Screening Guidelines for School Populations* ............................................................... 2-23

- Algorithm for Routine Tuberculosis Screening Of School Aged Children

*Screening Of HIV Infected Individuals* ........................................................................... 2-25

*Screening Guidelines For Foreign-Born Populations* ..................................................... 2-26

CASE MANAGEMENT ......................................................................................................... 3-1

*Diagnosis* ......................................................................................................................... 3-3

*Responsibilities for Management* .................................................................................. 3-4

- Family (attending) Physician
- Provincial Tuberculosis Control and/or Calgary Health and/or Calgary TB Clinic
- RHA and/or FNIHB Staff
- The Individual
- Algorithm for PHN Responsibilities in Case Management

*Treatment of Tuberculosis Disease* .................................................................................. 3-8

- Treatment Regimens
- Medications Used in the Treatment of Tuberculosis
- Directly Observed Treatment (DOT)

*Monitoring for Adverse Effects of Treatment* ............................................................... 3-16

- Before Beginning Treatment
- Routine Monitoring Once Treatment Has Begun

*Monitoring Response to Tuberculosis Treatment* ......................................................... 3-17

- Clinical Response
- Bacteriological and Radiological Response

*Drug-resistant Tuberculosis* ............................................................................................ 3-18

- Tuberculosis in Infants and Children
- Isolation of Cases of Tuberculosis
- Management of Recalcitrant Persons

TUBERCULOSIS CONTROL MANUAL
CONTACT INVESTIGATION ............................................................................................................. 4-1
When is a Contact Investigation Necessary? ............................................................................... 4-3
  Priority for Initiation of Contact Investigation ................................................................. 4-4
  Medical Information Review ............................................................................................... 4-5
  The Interview ..................................................................................................................... 4-6
  Field Investigation ............................................................................................................. 4-8
  Risk Assessment for M. tuberculosis Transmission ............................................................. 4-8
  Assigning Priority for Investigation of Contacts ............................................................... 4-9
  Evaluation and Management of Contacts .......................................................................... 4-10
Evaluation tools ..................................................................................................................... 4-11
  Medical History .................................................................................................................. 4-11
  Tuberculin Skin Test (TST) ............................................................................................... 4-11
  Chest Radiographs ............................................................................................................ 4-12
  Sputum Investigation ........................................................................................................ 4-13
  Preventive Therapy .......................................................................................................... 4-13
Algorithm for Tuberculosis Contact Follow-up ......................................................................... 4-14
Expanding the Investigation to Medium and Low Risk Casual Contacts ................................. 4-15
  The Concentric Circle Approach to Contact Investigation .............................................. 4-15
  Definition of Contacts ....................................................................................................... 4-15
Concentric Circle Analysis .................................................................................................... 4-16
Evaluation of Contact Investigation Activities ....................................................................... 4-17

TUBERCULOSIS PREVENTION ................................................................................................ 5-1
Preventive Drug Therapy ....................................................................................................... 5-3
  Candidates for Preventive Therapy .................................................................................. 5-5
Recommendation for Preventive Therapy ............................................................................... 5-6
  If the client agrees to take preventive therapy and the physician concurs ....................... 5-6
  If the client and/or his physician refuses preventive therapy ........................................ 5-8
Preventive Therapy Regimens ............................................................................................... 5-9
Bacille Calmette-Guérin (BCG) ............................................................................................ 5-10
Guidelines for the Prevention and/or Detection of Tuberculosis in Travellers ...................... 5-12
  Recommendations for Counselling Prior to Travel ......................................................... 5-12
  Prevention Strategy Options ............................................................................................ 5-13
  Recommendation for Follow-up after Return Home ...................................................... 5-14
APPENDICES

Appendix 1: Drug Considerations for Special Situations ................................................. 6-5
Appendix 2: Public Health Act and CD Regulations for Tuberculosis ............................. 6-7
Appendix 3: Sputum Collection ................................................................................. 6-9
   3A Sputum Induction (without aerosolization) ...................................................... 6-9
   3B Sputum Induction Using Aerosolization ......................................................... 6-11
   3C Sputum Collection Using Gastric Aspiration ................................................ 6-13
Appendix 4: Second-Line Antituberculous Drugs-Doses And Common Adverse Reactions .................. 6-15
Appendix 5: Isoniazid (INH) Preventive Therapy Fact Sheet ........................................ 6-16
Appendix 6: Rifampin Preventive Therapy Fact Sheet ............................................... 6-17
Appendix 7: Pyrazinamide Preventive Therapy Fact Sheet ......................................... 6-19
Appendix 8: Monitoring Worksheet for Active Treatment ....................................... 6-20
Appendix 9: Tuberculosis Treatment Letter for Patients .......................................... 6-21
Appendix 10: Monitoring Worksheet for Preventive Therapy .................................... 6-22
Appendix 11: Preventive Therapy Letter to Patient ............................................... 6-23
Appendix 12: Tuberculosis Control within Alberta Health and Wellness ..................... 6-24
Appendix 13: Important Contact Names And Phone Numbers .................................. 6-25

Appendix 14: Forms ................................................................................................. 6-27
   14A Directly Observed Therapy Record .............................................................. 6-29
   14B Treatment Record and Follow-up ............................................................... 6-31
   14C Tuberculosis Referral Form ....................................................................... 6-33
   14D Tuberculosis Update Form ...................................................................... 6-37
   14E Recommendation for Preventive Therapy .............................................. 6-40
   14F Preventive Therapy .................................................................................. 6-42
   14G Tuberculosis Contact List/Master Contact List ....................................... 6-44

Appendix 15: Interview Checklist ........................................................................... 6-48
Appendix 16: Resources ......................................................................................... 6-49

Appendix 17: Respiratory Isolation Guidelines ...................................................... 6-50
   Isolation Planning ........................................................................................... 6-52
   Risk & Needs Assessment ............................................................................. 6-53
   Development of Plan and Implementation of Airborne Precautions/Isolation ... 6-55
   Monitoring Isolation/Airborne Precautions .................................................. 6-57

Appendix 18: Screening And Prevention Of Tuberculosis in HIV Patients .................. 6-65
   Screening For Human Immunodeficiency Virus In Tuberculosis Patients And Their Contacts 6-67
INTRODUCTION
This manual was written as a reference guide for tuberculosis (TB) screening, diagnosis, prevention, treatment and community follow-up. It describes protocols, standards and recommendations for the management of TB in Alberta. These protocols are based on the recommendations of the Tuberculosis Committee of the Canadian Thoracic Society in the 5th edition of the Canadian Tuberculosis Standards and the opinions of local and national experts in TB diagnosis, treatment and control.

Although an attempt has been made to address all relevant TB issues in some detail, the manual will not duplicate information readily available in other publications:

- Guidelines for Preventing the Transmission of Tuberculosis in Health Care Facilities and Other Institutional Settings
- Tuberculin Skin Test Guidelines
- Tuberculosis Teaching Package

While protocols cannot and should not substitute for clinical judgement, adherence to these clinical protocols will, in most instances, result in improved patient care and the consequent control of TB.

The co-operation of all those involved in the management of tuberculosis is critical to the success of the provincial program.
Alberta’s Tuberculosis Control Program

The Tuberculosis Control Program in Alberta follows guidelines consistent with national standards. It is linked to the Centre for Infectious Disease Prevention and Control (CIDPC) program of Health Canada, through representation on the Canadian Tuberculosis Committee of CIDPC, and the national reporting system.

Direction of the program is structured to be in accordance with the *Alberta Public Health Act and Communicable Disease Regulation* (Appendix 2)

**Mission**
The mission of the Tuberculosis Control Program is to prevent and control the spread of tuberculosis in Alberta.

**Goal**
The ultimate goal of the Program is the elimination of tuberculosis, defined as one infectious case per million population per year. This goal can only be achieved by:

- diagnosing TB cases early and supervising treatment until cure is achieved
- identifying contacts of infectious cases promptly and providing preventive medication before disease develops
- maintaining tuberculosis surveillance and providing preventive therapy to high risk groups of persons with latent infection

Public health/communicable disease control responsibilities for TB are shared between Alberta Health and Wellness, the First Nations and Inuit Health Branch of Health Canada (FNIHB), and Alberta’s Regional Health Authorities (RHAS). Within this collaborative system, each partner has important roles and an important contribution to make toward the individual client and the community.

Partners have representation on the Tuberculosis Control Committee of Alberta (TCCA), which functions as an advisory to the Provincial Health Officer of Alberta Health and Wellness, and the Alberta Advisory Committee on Communicable Disease Control. The TCCA provides a forum to collectively discuss tuberculosis control issues, develop priority strategies and provincial program initiatives and evaluate outcomes.

The partners are also represented on the Alberta Tuberculosis Working Committee, a committee of public health tuberculosis control nurses that meets quarterly to discuss program issues and share educational opportunities.
The TB Program in Alberta has evolved in response to several realities such as:
  ★ the regionalization of Alberta’s health care system
  ★ the demographics of the disease across the province (cases are distributed approximately equally between the Calgary Region, Capital Health Region, and the remaining RHAs which include the areas serviced by FNHIB)
  ★ the move to transfer health services to First Nations communities
  ★ tuberculosis in the foreign-born
  ★ emerging issues, such as HIV/TB co-infection

It is recognized that each RHA has somewhat different operational structures and reporting mechanisms, and that roles may differ where specialized services are available. However, the general responsibilities and guidelines for the Alberta Tuberculosis Control Program are consistent across the province.

**Regional Health Authority (RHA)**

Delivery of the TB program including, surveillance, case finding, contact investigation, and supervision of treatment of both active TB disease and latent TB infection occurs at the regional and local levels through the office of the Medical Officer of Health. Each of Alberta’s 17 regional health authorities and the Alberta region of FNHIB are responsible for developing guidelines for regional programming based on provincial recommendations.

Linkages between the medical officer of health (MOH), Public Health Nurses (PHNs), primary care physicians, acute care, continuing care, correctional facilities and others who provide services to at-risk groups, as well as with Alberta Health and Wellness, ensure a multidisciplinary approach in the care of individuals at risk.

All individuals with infectious tuberculosis must be isolated until sputum specimens indicate they are no longer infectious. While some patients can be managed and isolated from new contacts at home, all regions must have access to appropriate in-patient respiratory isolation beds when necessary. Where facilities with appropriate engineering controls exist within the region, the individual may be admitted locally. However, when the services of a specialized tuberculosis physician are needed and not available regionally or no adequate regional isolation exists, referral to another centre may be necessary.

All regional laboratories should have the capacity to properly collect specimens for acid-fast bacilli (AFB) examination. Specimens are forwarded to the Provincial Laboratory for culture, identification and susceptibility testing.

Regional radiology departments need to have the capacity to review and report on relevant radiographs prior to their submission to Alberta Health and Wellness or the TB Clinic. Radiographs showing active disease, particularly cavitary disease, must be forwarded to Tuberculosis Control promptly.
Health Canada, First Nations and Inuit Health Branch (FNIHB)

FNIHB (formerly known as Medical Services Branch) within Health Canada is responsible for the delivery of health programs and services to First Nations and Inuit peoples. FNIHB is active in the areas of community and family health, substance abuse prevention and treatment, disease prevention and control, environmental health, non-insured health benefits and health information and analysis.

The delivery of First Nation Community Health services is conducted through regional offices, zone offices and a network of nursing stations, health centres and various other health facilities, many of which are situated in remote and isolated locations. In Alberta Region, the zone offices correspond with 3 treaty areas – Treaty 6 (central Alberta), Treaty 7 (southern Alberta) and Treaty 8 (northern Alberta).

FNIHB has invested support in a National TB Elimination Strategy focused on reducing the incidence of TB in First Nations and Inuit peoples of Canada. Alberta Region has dedicated a position, the TB Elimination Program Co-ordinator, to facilitate the implementation of TB elimination strategy activities in Alberta’s First Nations communities. Alberta Region has 2 Regional Community Medicine Consultants, one of whom oversees the TB Elimination Strategy and functions in the capacity of a Medical Officer of Health in responding to tuberculosis related events occurring in First Nations communities.

Tuberculosis control activities in First Nations communities in Alberta are co-ordinated, in collaboration with the TB Elimination Program Co-ordinator and the Regional Community Medicine Consultant, through a contractual agreement with the Alberta Health and Wellness TB Control Program. TB Program activities are delivered via the Community Health Program with administrative linkages to the Health Director, the Nurse in Charge (NIC) and the Zone Nursing Officer (ZNO).

Alberta Health and Wellness, Tuberculosis Control

Alberta Health and Wellness, Tuberculosis Control provides central co-ordination of management and control measures for cases, contacts, and others at risk of developing tuberculosis, as recommended by the Tuberculosis Committee of the Canadian Thoracic Society. This includes the control and provision of free drugs for treatment of active disease and latent infection, as well as tracking patient compliance with medication (as reported by regional staff). It also includes co-ordination of contact investigation, administration of the provincial TB Registry database, and reporting of cases nationally.

The role of Alberta Health and Wellness, Tuberculosis Control is to:

► support RHAs and FNIHB in the delivery of the tuberculosis program, including treatment of active tuberculosis, co-ordination of contact investigation, and preventive therapy
► work with RHAs and FNIHB in the co-ordination of case management, including monitoring treatment and compliance with medication regimens
► ensure the spirit and provisions of the Public Health Act and Communicable Disease Regulation are met
► report all cases of disease to Health Canada’s Canadian Infectious Disease Control and Prevention national database, and prepare annual reports for provincial distribution

The Provincial Tuberculosis Medical Consultant serves as the Director of the TB Program in Alberta, provides leadership for the program, and is instrumental in providing a “vision” for programming in the province.
In practical terms, 3 major “delivery arms” may be considered to flow from Alberta Health and Wellness; the 2 large urban regions, Calgary and Capital Health, and a third arm consisting of all other regions.

Each of the 2 RHAs with the largest populations (Calgary Health Region and Capital Health Authority) has a university affiliated tuberculosis physician identified to provide medical leadership within a specialized tuberculosis clinic. They provide liaison between inpatient and outpatient facilities and public health services within the region, and see out of region clients for assessment as necessary. The clinics manage surveillance, screening, contact investigations, prevention and treatment regimens (including entering regional data into the provincial database).

The other regions include many small- to moderate-sized urban communities, almost all of the off-reserve and many of the off-reserve aboriginal groups, and sparsely populated farming communities. Tuberculosis control in these regions is co-ordinated through Alberta Health and Wellness. The Provincial Tuberculosis Medical Consultant, the Alberta Health and Wellness Team Co-ordinator and Contact Investigation Co-ordinator, the regional Medical Officers of Health and their Tuberculosis Co-ordinators, and First Nations and Inuit Health Branch all have roles to play in the management of tuberculosis in these areas.

**TB Education**

Education regarding tuberculosis, both for professionals and for the public, is primarily the responsibility of the MOH and/or the Regional TB Co-ordinator. Alberta Health and Wellness staff is available as needed to assist with educational programming as identified by the regional co-ordinator. They also conduct workshops when needed to ensure education co-ordinators have the most up-to-date information.
<table>
<thead>
<tr>
<th>Alberta Health and Wellness</th>
<th>Regional Health Authority / FNIHB / Medical practitioner</th>
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<tbody>
<tr>
<td>**Tuberculosis Control * **</td>
<td><strong>Medical Officer of Health †</strong></td>
</tr>
<tr>
<td><strong>Standards/Policy</strong></td>
<td>Provides direction (through representation on the Tuberculosis Control Committee of Alberta) for provincial policy development. Directs policy and procedure development at the regional level.</td>
</tr>
<tr>
<td>Sets provincial standards according to accepted national and international guidelines.</td>
<td></td>
</tr>
<tr>
<td>Monitors tuberculosis control activities (on behalf of the PHO) to ensure provisions of the Public Health Act and Communicable Disease Regulations are met.</td>
<td>Ensures the appropriateness of Regional TB programs based on local demographics, in consultation with Tuberculosis Control. Has the final responsibility for TB program activity at the regional level.</td>
</tr>
<tr>
<td><strong>Reporting</strong></td>
<td>Reports all confirmed and probable cases to the office of the Provincial Health Officer within 48 hours of notification.</td>
</tr>
<tr>
<td>Ensures MOH is aware of all cases reported directly to Tuberculosis Control. Maintains a provincial registry of all TB cases and suspect cases that have been committed to treatment. Reports all cases annually to the Canadian Infectious Disease Control and Prevention national database.</td>
<td></td>
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* Both the CHA and CHR have roles in TB Management which significantly overlap with those of TB Control, though specialized TB Clinics staffed by TB specialists.

† It is recognized that there may be delegation of some of these roles to others at the regional level.
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<td></td>
<td>**Regional TB Co-ordinator †</td>
</tr>
<tr>
<td><strong>Active Disease</strong></td>
<td><strong>Other RHA/FNIHB TB Program Public Health Nurses</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Attending Physician</strong></td>
</tr>
<tr>
<td>Prescribes treatment for active disease based on clinical and laboratory assessments. As per the footnote, such activity is regularly performed by the tuberculosis experts staffing the TB clinics of the CHA and CHR.</td>
<td>Works with TB Co-ordinator and regional administration to ensure adequate resources are available for treatment. This includes medication administration and hospitalization when necessary (including transportation to an appropriate facility). Liaison with local physicians regarding their role in TB management and to ensure active cases receive appropriate treatment to rapidly render them non-infectious, prevent drug resistance and provide lasting cure. Liaison with local pharmacists to ensure notification when local physicians, who may be unaware of the central supply of anti-TB drugs, prescribe these drugs for a suspect active case. Ensures all local hospitals have a supply of intravenous pyridoxine available in case of an overdose of INH. Receives medications from Tuberculosis Control and forwards to appropriate staff for distribution. Assists with monitoring and reporting of medication administration and compliance. Communicates with Tuberculosis Control and local PHN as needed regarding adverse effects and monitoring. Provides education regarding tuberculosis, the need for compliance with medication, and the necessity of routine monitoring for adverse reactions. Administers medication in the community. Regularly assess clients for signs of treatment failure and adverse reactions from medication (symptom inquiry, arranging for routine lab work, etc.). Communicates with regional TB Co-ordinator • monthly regarding routine compliance • when adverse effects suspected. Consults with TB specialist (facilitated through the office of the MOH) before beginning treatment for active or suspect active cases. Ensures all TB medications are supplied only through the provincial supply. Assesses clients for treatment failure and/or adverse reaction to medication. Encourages HIV testing of all patients with active TB.</td>
</tr>
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<tr>
<td><strong>Recalcitrant Patients</strong></td>
<td>Provides information to regional staff regarding stepped interventions and need for patient education.</td>
</tr>
<tr>
<td>Conducts consultation with regional MOH regarding need for detention in the case of non-compliance with treatment.</td>
<td>Assists with arrangements to carry out the Public Health Act for recalcitrant patients.</td>
</tr>
<tr>
<td>Assists when necessary with definition of “stepped intervention.”</td>
<td>Educates clients regarding the need to take medication for active disease, and consequences of not doing so, including detention.</td>
</tr>
<tr>
<td>Appropriate enforcement of Public Health Act for recalcitrant patients.</td>
<td>Works with Public Health staff to educate clients regarding need for compliance with treatment.</td>
</tr>
<tr>
<td><strong>Contact Investigation</strong></td>
<td><strong>Regional TB Co-ordinator †</strong></td>
</tr>
<tr>
<td>Co-ordinates contact investigation relating to each infectious case identified (to facilitate cross-regional and interprovincial follow-up). Much of this activity may be performed out of the TB Clinics.</td>
<td>Submits contact lists to Tuberculosis Control within 1 week of notification of an infectious case (to assist with co-ordination of activities and data input for TB registry database).</td>
</tr>
<tr>
<td>Liaison with CIDPC to ensure out of country contacts are notified.</td>
<td>Locates individuals for treatment and/or contact investigation.</td>
</tr>
<tr>
<td>Working under the Public Health Act, conducts (or ensures) investigations of the source of infection and all contacts.</td>
<td>Submits contact lists to regional TB Co-ordinator and/or Tuberculosis Control.</td>
</tr>
<tr>
<td></td>
<td>Supports the need for contact investigations and assists with client education as necessary.</td>
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</tr>
<tr>
<td><strong>Client assessment</strong></td>
<td><strong>Regional TB Co-ordinator †</strong></td>
</tr>
<tr>
<td>Consult with RHA staff and local physicians regarding TB investigations (need for radiograph investigation, tuberculin skin testing, sputum collection, etc.).</td>
<td>Monitors appropriateness of referrals for assessment of significant reactors.</td>
</tr>
<tr>
<td>Ensures services (laboratory, radiology, public health) are available in the region or are accessible through another region.</td>
<td>Ensures regional radiology departments forward radiograph films with radiology reports and referral forms to Tuberculosis Control or the appropriate TB Clinic for assessment.</td>
</tr>
<tr>
<td>Ensures all clients who have significant TST results are appropriately referred for assessment for disease. This may include ordering radiographs and lab work.</td>
<td>Administers and reads TST.</td>
</tr>
<tr>
<td><strong>Prevention</strong></td>
<td><strong>Other RHA/FNIHB TB Program Public Health Nurses</strong></td>
</tr>
<tr>
<td>Recommends preventive therapy for those referred who are at higher risk of developing disease.</td>
<td>Refers clients (or client information) to appropriate source for assessment (Tuberculosis Control or physician).</td>
</tr>
<tr>
<td>Provides preventive therapy drugs free of charge.</td>
<td>Refers as appropriate for radiograph, blood-work, sputum, etc.</td>
</tr>
<tr>
<td>Recommends alternative follow-up when medications are refused or not tolerated.</td>
<td>Communicates referral activity with TB Co-ordinator.</td>
</tr>
<tr>
<td>Liaison with local physicians to ensure understanding of prevention programs.</td>
<td>Co-ordinates return of “Recommendation for Preventive therapy” form with PHN and physician signature.</td>
</tr>
<tr>
<td>Ensures programs are in place to achieve as high a compliance rate as possible.</td>
<td>In some regions, forwards medication to the appropriate office for distribution to client.</td>
</tr>
<tr>
<td>Ensures TB medications are not dispensed through local pharmacies.</td>
<td>Consults with field staff regarding adverse reactions and compliance.</td>
</tr>
<tr>
<td><strong>Attending Physician</strong></td>
<td></td>
</tr>
<tr>
<td>Assesses referred individuals for TB with physical exam, chest radiograph, sputum.</td>
<td>Discusses recommendation with client and physician.</td>
</tr>
<tr>
<td>Consults with Regional TB Co-ordinator, MOH and/or Tuberculosis Consultant regarding concerns related to assessment.</td>
<td>Signs and returns recommendation form through TB Co-ordinator (if client and physician agree).</td>
</tr>
<tr>
<td>Discussed recommendation (including alternate recommendations) with client to assist with decision making.</td>
<td>Dispenses drugs and monitors client for compliance and adverse effects of medication.</td>
</tr>
<tr>
<td>Assesses any concern with interaction with TB drugs and other medications.</td>
<td>Arranges for other follow-up as recommended by Tuberculosis Control.</td>
</tr>
<tr>
<td>Signs recommendation form if in agreement, and forwards it to the appropriate PHN.</td>
<td>Assists with monitoring for adverse effects.</td>
</tr>
</tbody>
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</table>

**TB Education**

Provides training as necessary to ensure Regional TB Educators have up-to-date information for presentation locally.

Participates in, and supports the development of, educational resources to assist RHAs to respond to needs in the community.

Collaborates with RHA staff to assist with workshops for staff and/or the public when invited.

Distributes relevant TB articles to MOH and regional co-ordinators as appropriate.

Ensures continuation of provincial TB working group to support continuing education, maintain awareness of TB issues and introduce new information.

Assists and supports Regional TB educators with training workshops/inservices for staff and/or the public when appropriate.

Circulates education articles to others involved in the TB program regionally.

Works with family physicians and pharmacists to ensure understanding of the fundamentals of tuberculosis control in Alberta.

Supports regional appointment of specialized TB Educator (and may fulfill this function).

Assists educator when needed.

Circulates articles of interest whenever possible.

Attends quarterly Provincial TB Working Group meetings and disseminates information to regional health staff.

Provides education for clients relating to TB infection and disease, assessment, treatment and prevention.

Assists with regional education as appropriate.

**Regional TB Educators:**

These individuals are appointed at the regional TB Program level. They take on the role of providing education regarding tuberculosis to clients, communities, other regional staff and physicians.

Educational support is available through Alberta Health and Wellness for training and resources.

Takes advantage of regional workshops/inservices to become more familiar with provincial and regional TB programs.

Provides education regarding TB to clients as needed.

Supports regional public health staff in relation to client education.

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The primary goals of tuberculosis screening programs are to:

- Identify those with active tuberculosis
- Identify from amongst the infected, those at high risk of progression from infection to disease who would benefit from preventive therapy

The primary focus of screening should therefore be on groups for which tuberculosis rates are considerably higher than the general population.

Screening programs may also be developed:

- to establish baseline tuberculin skin test results for individuals who will require periodic re-testing. such as those who have an occupational risk of exposure
- for disease surveillance purposes

**Groups Requiring Screening**

1. **Foreign-born individuals**, referred for medical surveillance by Citizenship and Immigration Canada. No comprehensive list of TB endemic countries can be provided here as it is never static. As economic and health conditions change, so does the risk for diseases such as tuberculosis. Generally, countries with health standards similar to Canada’s will not carry a high risk for TB.

2. **Individuals in health professions** and others in the community or facilities/institutions, who work closely with populations that are at higher risk for tuberculosis disease (see #6 on the following page). In general, the latter would include the elderly, the homeless, substance abusers, foreign-born individuals from TB endemic countries and Aboriginal Canadians (including status and non-status Indians, Inuit, Métis).

3. **Residents in institutional** settings such as correctional facilities, alcohol and drug rehabilitation centres, continuing care centres where the elderly reside.

4. **Children living and attending school on reserve.** This program is a reflection of the relatively higher rates of tuberculosis infection and disease in the aboriginal population. It not only identifies children who have become infected, but gives valuable clues regarding TB activity within each community.

5. **Individuals in the community who are at increased risk for recent infection** with the tubercle bacillus, including those in close contact with a person with infectious tuberculosis and travellers to TB endemic countries.
6. **Individuals who have medical conditions** which put them at increased risk of infection progressing to disease, including:
   - HIV infection
   - carcinoma of the head and neck
   - lung cancer
   - hematologic malignancies—lymphoma, leukemia
   - diabetes—especially if insulin dependent and poorly controlled
   - chronic corticosteroid use (at least 15 mg/day for > 2 weeks)
   - alcohol abuse
   - IV drug abuse
   - gastrectomy
   - end stage renal disease — especially dialysis dependent renal disease
   - silicosis
   - organ transplant candidates (because they will be on immunosuppressive drugs)
   - other immunosuppressive disorders or disorders requiring the use of immunosuppressive drugs
   - radiotherapy
   - malnutrition (i.e. weight less than 90% of ideal)

   • Note: Especially at risk are those who have these risk factors and also have an increased risk of being infected by virtue of belonging to a high-risk group such as the elderly, aboriginals, homeless or other inner-city persons, foreign-born persons from TB endemic countries or Canadian-born travellers to TB endemic countries.

7. **Individuals with a history of active TB** who did not receive adequate treatment as determined by Tuberculosis Control (e.g. TB prior to the mid 1950s, when satisfactory drug combinations for treatment did not exist, or incomplete outpatient treatment at any time).
Screening and Diagnostic Tools

For the purpose of screening, diagnostic tools are used to rule out the presence of disease prior to recommending and starting treatment for latent TB infection. A combination of these diagnostic tools can be used to confirm active TB disease in clients with symptoms consistent with active TB.

The sequence of the screening components is dependent on the reason for screening. (For example, clients awaiting continuing care placement must have a chest radiograph prior to admission, and if the radiograph or symptoms suggest active disease, sputum samples for AFB smear and culture should be submitted prior to admission. Tuberculin skin testing may be done after admission.) Generally however, the program should consist of the following:

- history and symptom inquiry (this should always be the first step)
- tuberculin skin test (TST)—to identify individuals who have been infected by tubercle bacilli
- chest radiograph if history and/or tuberculin skin test indicate necessity
- sputum submitted for AFB smear and culture if symptom inquiry, chest radiograph and/or tuberculin skin test indicate necessity

History and Symptom Inquiry

Information obtained through history and symptom inquiry assists in determining the need for further screening. (For example, a reliable history of previous positive TST or old TB indicates TST should not be repeated). This information is also integral to ensuring appropriate referrals are made to a TB specialist.

History is important in assessing the risk of infection and the likelihood of progression from infection to disease, as well as the possibility of old or current disease. Important areas to explore would include:

- exposure to tuberculosis (past or recent)
- previous active tuberculosis and treatment
- previous preventive therapy
- previous tuberculin tests, BCG, chest radiographs
- country of birth
- travel to countries which may have a high incidence of TB
- any time spent in a correctional facility
- intravenous or other substance abuse
- other risk factors for infection (e.g. aboriginal, elderly, homeless, health care worker)
- general health status, and risk factors for progression of infection to disease
  (see page 2-4)
Symptom inquiry will assist with interpretation of other components of the screening process, and the need for more immediate referral. Symptoms to alert the practitioner to the possibility of active TB disease would be:

- chronic cough lasting more than 2 weeks, especially if productive
- weight loss
- night sweats
- fever (often low grade)
- fatigue
- anorexia
- hemoptysis
- suggestive extra-pulmonary signs or symptoms in a high risk patient

If symptoms suggest the possibility of disease:

- submit 3 separate sputum samples for AFB smear and culture (see page 2-12)
- refer to physician for chest radiograph and further medical assessment
- review tuberculin reactor status and administer tuberculin skin test if status unknown or previously non-significant

  Note: Except in children, the use of a TST in the diagnosis of disease is quite limited. However, it may aid in the interpretation of other information.

Non-respiratory (often referred to as extra-pulmonary) tuberculosis can involve any organ. Symptoms are dependent on the organ system affected. (For example, TB of the kidney may cause frequency, dysuria, flank pain, and hematuria, while TB of the spine may cause back pain.)

- Non-respiratory TB is seldom infectious, and although the infected individual may be ill and require treatment, he or she does not as a rule, pose a public health threat.
- Investigation to identify the source of the infection is still indicated, as it may indicate an unidentified case of active infectious tuberculosis in the community.
- As with cases of infectious TB, medications for treatment of non-respiratory tuberculosis are provided free of charge by Alberta Health and Wellness.
**Tuberculin Skin Test**

The Mantoux test, using Protein Purified Derivative (PPD), is the only approved method of tuberculin skin testing in Alberta. Other tests, such as multiple puncture tests are not as accurate and are not acceptable. For detailed information about tuberculin skin testing, see the *Tuberculin Skin Test Guidelines* and the *Tuberculosis Teaching Package*.

PPD is supplied by Alberta Health and Wellness to RHAs free of charge for:

1. Organized province-wide screening programs that are the responsibility of Public Health such as:
   - screening of healthcare workers on employment and if recommended because of high risk of exposure (but not for routine screening of staff unless the workplace has been assessed as a high risk facility, see *Guidelines for Preventing the Transmission of Tuberculosis in Health Care Facilities and other Institutions*)
   - screening of clients in continuing care facilities as part of the admission screening
   - screening of contacts of cases of active tuberculosis
   - screening of inmates and staff in correctional centres

2. Regional programs that reflect public health practice, approved by the regional medical officer of health to address specific demographics. For example, screening of grade 1 children in northern off-reserve communities, newcomer’s clinics that are held to address the medical needs of immigrants.

PPD is not currently supplied for travellers, occupational health programs outside of those referred to on page 2-3, #2 or diagnostic purposes (either in facilities or physician offices).

**Precautions and Adverse Reactions**

Pregnancy

While pregnancy is not a contraindication to the administration of a tuberculin skin test, *routine screening tests* in the absence of symptoms, HIV infection, or recent contact, are usually deferred until after delivery.

► However, when the woman is HIV positive, is part of a contact investigation or has symptoms suggestive of TB, testing should *not* be delayed.

► If a woman is pregnant and is thought to be newly infected or is HIV co-infected, preventive therapy should not be deferred until after pregnancy.
Allergic reactions to PPD are very rare but not unheard of. Epinephrine Hydrochloride Solution (1:1000) must be readily available when administering a tuberculin skin test.

Pain, itchiness, discomfort at the site may occur, and should be treated with the use of cold compresses.

Adverse reactions should be reported to Alberta Health and Wellness, Tuberculosis Control, using the Provincial Adverse Reaction reporting form.

**Administration**

The TST is performed by intradermal injection of 0.1 ml of 5 tuberculin units (STU) of Purified Protein Derivative (PPD).

It must be administered and read by a health care professional who has had additional training and experience in the technique of intradermal injections, interpretation of tuberculin skin tests, and appropriate referrals and/or follow-up.

**Self-reading of a tuberculin skin test is not an acceptable practice, and should never be allowed.**

**Interpretation**

► < 5 mm of induration is read as **non-significant**. On occasion, when an individual is at very high risk of latent infection and has an immunocompromising condition such as HIV, they may still be a candidate for preventive therapy even with a TST reading of less than 5 mm induration.

► 5-9 mm of induration is **significant** if the test was performed on:
  • individuals with HIV infection, or others who are severely immunocompromised
  • close contacts of a person with infectious TB disease
  • persons whose chest radiograph suggests disease (current or old disease, see page 2-11 for x-ray indicators of disease)

► 10 mm or more of induration is considered **significant** in all other persons.

**Tuberculin skin test conversion**

► **TST conversion** in a healthy individual who is not a known close contact of a case of active TB, is defined as a reaction of 10 mm or more, when an earlier test (within the previous 2 years) resulted in a reaction of less than 5 mm.
If a test result within the previous 2 years was between 5 and 9 mm in a healthy individual, the definition of conversion becomes more difficult.

- If the reason for the current testing is contact with an infectious case of TB, an increase of 6 mm or more is considered to be a conversion reaction.
- If the reason for the current testing is routine screening, an increase of 10 mm or more is considered to be a conversion reaction.

**2-step Tuberculin Skin Testing**

This procedure is used to identify individuals who were infected in the remote past, but now have decreased sensitivity to tuberculin. It allows one to distinguish between a booster response to remote previous infection and a conversion caused by recent infection (see: *Tuberculin Skin Test Guidelines*).

**Indications for 2-step TST**

Two-step testing should be performed for individuals who:

- may be subsequently tested at regular intervals (e.g. health care workers at the time of employment)
- are elderly (on admission to institutional care)
- will be travelling to TB endemic countries for prolonged periods of time (see travel section)
- have a past history of known exposure indicating they could be reactors

There is no “hard and fast” rule around determining the frequency of 2-step testing. However, because the majority of TB disease develops within 2 years of infection, this time period can be used as a general guide to assist in decision making. The following factors must be considered for each situation:

- What is the probability of exposure to tuberculosis since the last TST?
- Why is the tuberculin test being done?
- What is the state of the individual’s immune system?

For example:

- Health Care Workers—if there is a documented 2-step, and there has been regular tuberculin skin testing according to the risk recommendations, the 2-step procedure is only repeated if the worker changes employment, and a lapse of more than 2 years has occurred since the last TST.
- Before travel to a TB endemic country—a 2-step should be administered (if time permits) if more than 2 years has elapsed since any previous testing. It is important to tuberculin skin test previous non-significant reactors, upon their return to Canada. See page 5-12 for further recommendations regarding travellers.
- Individuals at high risk of latent infection and who are more likely to have a poor immune response, especially if entering communal living arrangements—2-step if more than 2 years since last TST.
- Contact investigation—a 2-step test is **not** recommended during contact investigation, as it is not possible to make a distinction between a boosted reaction and a conversion.
Follow-up of a significant TST reactor

All reactors who have a significant tuberculin skin test have potentially been infected with tubercle bacilli.

► Report reactors to the designated person or persons responsible for tuberculosis management according to regional/zone protocol, to ensure appropriate referrals.
► Complete history and symptom inquiry, if it has not already been done.
► If client is coughing, submit sputum specimens for AFB smear and culture.
► Arrange for chest radiograph (and medical assessment if needed) if one has not been done in the preceding 6 months.

Radiographic Investigation

All those with a significant tuberculin test should have a chest radiograph to rule out current or past disease, but they do not all need to be referred to Tuberculosis Control.

Refer to TB Control or the Calgary or Capital Health TB Clinic if one of the following applies:

► the individual meets the criteria to be considered as a candidate for preventive therapy (see page 5-5, “candidates for preventive therapy”)
► the individual has symptoms of TB - collect 3 sputums, refer to family physician for medical assessment (including chest radiographs), ensure radiograph is forwarded to TB Control with a referral form if appropriate.

Referral to Alberta Health and Wellness, TB Control
(for RHAs other than # 4 or # 10)

“Referral to TB Control” means ensuring a radiograph is submitted to TB Control, accompanied by information including history, symptom inquiry, tuberculin status and any other relevant information. From this assessment, the TB Physician will determine whether a TB Clinic appointment needs to be made.

The “Tuberculosis Referral Form” (see Appendix I 4C) should be completed and used as a requisition to order a chest radiograph for those whose radiographs need to be reviewed by a TB Physician. Using this form ensures that radiographs and reports are sent to Alberta Health and Wellness Tuberculosis Control, and that information the physician needs to assess the radiograph is available to him.
Referral to the Capital Health or Calgary TB Clinic

The Capital Health Authority (#10) and Calgary Health Region (#4) refer to their respective clinics according to local protocol.

Referral to Family Physicians

Individuals with significant reactions to tuberculin tests who do not appear to be candidates for preventive therapy or who have symptoms suggestive of tuberculosis, should be referred to the family physician for assessment, including radiographs. TB Medical Consultants are available for physician consultation when necessary (see Appendix 13 for important contacts).

Ensure this referral includes the reason for screening and the purpose of the referral, and request a copy of chest radiograph reports. If these reports indicate any of the radiological descriptors of tuberculosis, ensure appropriate referral to Tuberculosis Control or one of the TB Clinics as appropriate.

When individuals with significant reactions do not have a family physician, or do not have health care insurance (e.g. foreign students), referral for assessment becomes more difficult.

Regional staff should try to assist the individual to find a family physician. If this is not possible, the regional MOH has the option of ordering the radiograph, ensuring that there is local reading and reporting of radiological findings.

The region carries the financial responsibility in the case of an individual who does not have health care coverage.

Radiological Descriptors of Tuberculosis Infection or Disease

When radiograph reports indicate any of the following terms, the radiograph should be seen by a specialized tuberculosis physician. Direct the radiology department to forward current and old radiographs (with the radiology report and a referral form with the most recent tuberculin status) to Alberta Health and Wellness Tuberculosis Control, the Capital Health TB Clinic or the Calgary TB Clinic, as appropriate.

Recognizing that one may not be able to distinguish active TB from inactive TB based on radiograph alone, these radiological descriptors are most suggestive of previous and presumed inactive TB.

- Apical fibrosis or pleural thickening (other than apical “capping”)
- Pleural calcification or fibrocaldification
- Old granulomatous disease or old tuberculosis
- Upper lobe fibronodular abnormality
- Thoracoplasty
- Healed primary focus/complex (Ghon focus/complex)

These radiological descriptors are most suggestive of active or current disease.

- Upper lung zone pneumonitis
- Cavitation
- Pleural effusion in the young, newly infected, or close contacts
- Mediastinal or hilar adenopathy in children who are close contacts or in those of any age who are HIV co-infected
Sputum Collection For Acid - Fast Bacilli (AFB)

**Note:** Collect 3 sputum specimens if the client is symptomatic and at least 1 if they have no symptoms. An “on the spot” specimen is still better than none.

**Purpose**

- to allow for a definitive diagnosis of pulmonary tuberculosis and to estimate the degree of infectiousness
- to enable the performance of drug susceptibility tests that will, in turn guide treatment
- to enable DNA fingerprinting of the organism for epidemiological purposes

**Procedure**

**Note:** Any time a health care worker is assisting a client suspected of having active TB disease to produce sputum, appropriate precautions should be taken to protect the worker and others in the home, hospital or clinic. Sputum specimens should be collected in a separate room with air vented to the outside, or in the open air. Masks capable of filtering 95% of particles of 1 micron or larger should be worn.

1. Label specimen bottle clearly, with client’s name, date of birth, and TB file number if known.

2. Provide the client with the following instructions for collection:

   Collect first morning, deep cough specimens. When 3 sputum specimens are requested, collect the samples on 3 consecutive mornings in 3 separate containers. (Do not combine several specimens in one container or submit cumulative specimens collected over a period of 24 hours or more).

   Before coughing up sputum, clear the back of the throat of mucus.

   Cough deeply and vigorously to raise sputum from the lungs. If there is difficulty raising sputum, breathe through the mouth as deeply as possible, hold the breath for a moment and cough forcefully and deeply. Spit out everything from the mouth into the container.

   Submit specimens for analysis as soon as possible after collection. Unless they will be processed within 1 hour, refrigerate the specimens until they can be sent to the laboratory, but be sure they do not freeze.
Tighten lids on the containers and record the date and time of specimen collection on the bottle label. Wrap the individual sputum container in absorbent material (e.g. cotton batting), and place it in the ziplock biohazard bag.

3. Complete the lab requisition, including the name of the attending physician and TB file number if known. Ensure the names on lab requisition and sputum container match and place the requisition in the sleeve of the biohazard bag (not in the interior of bag with the specimen container).

4. Forward properly packaged sputum specimens to the Provincial Laboratory according to regional protocol. All specimens must be placed in a container that will not allow escape of any contents under normal conditions of handling and transport (e.g. plastic container with a lid or metal tool box).

**Results of examination for AFB** (smear) should be available to the specimen submitter within 24 hours of receipt by the laboratory.

- Results of culture examination, and other confirmatory tests may take several days to several weeks. All culture positive specimens will automatically be tested for susceptibilities to first-line drugs to ensure adequate treatment.

- All new positive smears and cultures should be reported immediately to Tuberculosis Control, the forwarding physician and the local MOH.

- If a positive smear is suspected of being due to a nontuberculous mycobacterium, then a special request may be made to have the provincial laboratory perform a nucleic acid amplification (NAA) test which will allow immediate distinction between *M. tuberculosis* complex organisms and other mycobacteria.
Screening Guidelines For Continuing Care Facilities

The elderly are at risk of being infected with tubercle bacilli by virtue of having lived at a time when TB was very common; with the waning of immunity that comes with age or co-morbidity, these dormant bacilli may re-activate. Those living and working in residential and continuing care centres are at risk because of frequent close contact with the elderly. Screening in this population is aimed at identifying active cases, preferably before they enter the facility, and preventing potential new cases.

Recommendations for Residents

Pre-admission Screening

1. A chest radiograph must be performed within 6 months of application for admission. This is a legislated requirement for Continuing Care Facilities regardless of tuberculin status.

   This radiograph should be ordered by the physician as part of the pre-placement physical exam. If it is not already done, refer the client back to the physician.

   If admission is delayed, and occurs 12 months or more from this radiograph date, another radiograph must be performed prior to admission.

   Chest radiograph reports are reviewed by the placement review committee and the receiving facility to ensure that appropriate referrals have been made (see page 2-10 for referral criteria).

2. History and symptom inquiry is done to determine past or recent exposure to tuberculosis, past tuberculosis treatment, or the probability of active TB. If symptoms suggest current active tuberculosis, the interviewer should:
   - collect sputum specimens for AFB smear and culture, using auger suction or other means if necessary (see page 2-12)
   - arrange for the administration of a TST (if no history of previous significant reaction)
   - refer to the family physician for assessment and referral if necessary

Admission Protocol

1. History and symptom inquiry as for pre-admission screening.

2. Tuberculin skin test should be performed within 1 month of admission if:
   - there is no documentation of previous TB disease
   - there is no documentation of any previous skin testing (do a 2-step TST)
there is documentation of previous non-significant TST done more than 6 months prior to admission
  – If the previous TST was a single step—do a 2-step TST
  – If the previous TST was a 2-step, and was done within the past 2 years, do a single-step TST
  – If the previous TST was a 2-step, and was done more than 2 years previously, do a 2-step TST

Follow-up of significant reactors:

↑ Individuals who have a significant TST, and also have a medical condition that places them at higher risk of infection progressing to disease (see page 2-4 for medical conditions that increase risk), should be referred for assessment to Tuberculosis Control, the Calgary or Capital Health TB clinic, even if they have normal chest radiographs.

↑ All other significant reactors are referred to the family physician for assessment and x-ray if not already done. Every facility should have a system in place to remind staff to collect a sputum specimen if these clients ever develop symptoms suggestive of active tuberculosis.

Ongoing Surveillance

Once initial screening is complete, residents will fall into 1 of the following categories, each of which is associated with recommendations.

1. Non-significant tuberculin reactor—no further follow-up unless the resident:
   • is in contact with active disease—follow-up as directed
   • develops symptoms suggestive of tuberculosis (see page 2-6)—send sputum for AFB and refer to family physician for follow-up

2. Significant tuberculin reactor—no further follow-up unless the resident:
   • develops respiratory symptoms—send sputum for AFB and refer to family physician for chest x-ray
   • has or develops an immunocompromising condition known to increase the risk of progression from infection to disease—refer to TB physician for assessment for preventive therapy
   • is in contact with an active case—investigate as appropriate

3. Those who have lung scars consistent with old healed tuberculosis on admission radiographs—follow-up as directed by TB Control or the Calgary or Capital Health TB Clinic.
Recommendations for Staff and Volunteer Screening

Pre-employment Screening

All staff and volunteers should be screened prior to employment through the occupational health program. This screening should consist of:

► history and symptom inquiry

► 2-step tuberculin skin test unless there is documentation of previous tuberculosis disease or significant reaction
  - If the result of the TST is non-significant—no further investigation is needed unless there is contact with a new infectious case.
  - If new significant reactors are identified, they require a complete TB assessment, including chest radiograph and sputum investigation. Refer either to the family physician, or to TB Control as appropriate.
  - Documented previous significant reactor—baseline chest radiograph report should be on file. If no radiograph has been done within 12 months of employment, one should be ordered through the Occupational Health Program.

Ongoing Surveillance

The following recommendations relate to ongoing surveillance for staff/volunteers according to their initial assessment criteria.

Non-significant reactors:

► repeat tuberculin skin testing according to risk of exposure to tuberculosis, or if the individual is in contact with a case of active TB

Significant reactors—repeat radiographs only if the individual:

► is in contact with an individual with infectious tuberculosis
► develops symptoms of TB (also submit sputum for AFB and refer as appropriate)

See “Guidelines for Preventing the Transmission of Tuberculosis in Health Care Facilities and Other Institutional Settings,” pages 4-6.
Algorithm For Continuing Care Client Admissions Screening

History and Symptom Inquiry

No significant history or symptoms
- Refer to family physician for radiograph

History and/or symptoms suggestive of tuberculosis (collect sputum for AFB)
- Refer to family physician for radiograph

Chest radiograph

Normal and documented previous significant TST
- History of high risk condition
  - Refer to TB Control or TB Clinic
- Healthy client
  - TST (within one month of admission)
    - Normal and no previous significant TST
      - Refer to TB Control or TB Clinic
    - Abnormal (see page 2-11)
      - Refer to TB Control or TB Clinic

Significant TST but otherwise healthy client
- Flag chart and collect sputum if client develops symptoms

Significant TST with history of high risk condition (see page 2-4)
- Refer to TB Control or TB Clinic
- No follow-up unless exposed or symptoms of TB develop

Result 0-9 mm
Algorithm For Staff Screening

History and Symptom Inquiry

No significant symptoms

Previous documented significant TST
- Baseline chest radiograph
- Refer to TB Control if candidate for preventive therapy
- Submit Sputum if at any time symptoms suggest active disease

No previous significant TST

Symptoms suggestive of tuberculosis
(collect sputum for AFB, do TST)

Refer to occupational health or family physician for chest radiograph and TB assessment

TST

Result 0-9
Follow-up testing according to risk assessment for institution

Result ≥10mm
Refer to family physician or TB Control as appropriate (See 2-10)
Screening Guidelines For Acute Care Facilities

The “Guidelines for Preventing the Transmission of Tuberculosis in Health Care Facilities and Other Institutional Settings” should be followed in the development of policies dealing with TB treatment and screening programs within the acute care facilities.

Think TB!

1. Admission history, for elective or emergency admissions, and particularly for persons from TB endemic countries, aboriginals and inner city residents, should specifically identify symptoms of tuberculosis, such as productive cough, weight loss, fever, night sweats, fatigue, or anorexia.

   If symptoms are present, collect 3 sputum specimens for AFB smear and culture, ensure a chest-radiograph is performed, and assess tuberculin status.

2. Patients with symptoms or radiographic abnormalities that suggest active pulmonary TB should be isolated in the best available on-site room until sputum results are obtained.

   All staff and visitors should be masked upon entry to the room, and sputum should be obtained for AFB smear and culture. Such isolation precautions should be maintained until the individual is determined to be non-infectious (smear-negative).

   Confirmed smear-positive patients must be isolated in a room with proper engineering controls to prevent the spread of tuberculosis.

3. When tuberculosis is suspected, consultation with an expert in tuberculosis management is advisable.

   Employee screening should be routine, and follow the same guidelines as continuing care staff.
Screening In Correctional Institutions and Substance Abuse Rehabilitation Centres

Residents and staff in correctional institutions and rehabilitation centres are at increased risk for exposure to tuberculosis.

They are more likely than the general population to be infected with tubercle bacilli and have risk factors that cause this infection to progress to TB disease. Environmental characteristics, such as shared air space, makes airborne transmission more likely.

Recommendations for Residents of Correctional Institutions and Rehabilitation Centres

Admission Screening

1. TB history to determine:
   - past exposure or treatment
   - previous history of tuberculin testing

2. Symptom inquiry to determine the possibility of current disease.
   - If the inmate or resident is symptomatic, collect sputum for AFB smear and culture.
   - Isolate the individual until sputum smear results are known.

3. Evaluate the individual’s risk factors for HIV.
   - There is a very high risk that individuals who are both HIV and TB infected will develop active TB disease.

4. Tuberculin skin testing should be performed within 1 month of admission unless documentation of a previous significant test can be obtained.
   - 2-step TST (on admission only) should be considered when the policy of the institution is one of yearly skin testing.
   - Further investigation following admission screening will be in accordance with the algorithm on page 2-22.

Ongoing Surveillance

The federal and provincial correctional services have different programs for ongoing surveillance of both inmates and staff.

Federal programs promote annual testing for all inmates and staff.
   - Annual TST is offered and recommended for all non-significant reactors.
   - Annual symptom inquiry is required for all those whose skin tests were previously significant.
**Provincial** correctional facilities assess the tuberculosis status of inmates on admission. It is recommended that these facilities, and substance abuse rehabilitation centres adhere to the following guidelines for further assessment.

Non-significant tuberculin reactor—no further follow-up is needed unless the individual:
- has been in contact with an active case (contact investigation as per protocol); or
- develops respiratory symptoms suggestive of TB (collect sputum for AFB and arrange for chest radiograph to be performed)

Significant tuberculin reactor with normal radiograph—no further follow-up is needed unless the individual:
- is a candidate for preventive therapy (refer to Tuberculosis Control); or
- develops symptoms suggestive of disease activity (collect sputum for AFB and arrange for a chest radiograph); or
- has or develops an immunocompromising condition known to increase the risk of progression from infection to disease (see page 2-4 and refer to TB physician for assessment for preventive therapy)

Those who have lung scars on admission radiographs should be followed as directed by Tuberculosis Control or the Calgary or Capital Health TB Clinic.

**Admission Screening for Short Stay Detoxification Centres**

Individuals entering facilities that serve as short stay centres for the control of substance abuse, (< 3 months) should be screened to rule out active respiratory TB disease.

All admissions should have, at minimum, a symptom inquiry completed. Collect sputum and refer to physician for assessment if symptomatic.

**Employee Screening**

Employee screening should be routine and at minimum, follow the same guidelines as for continuing care and acute care staff. Some programs, such as federal correctional facilities and AADAC rehabilitation centres encourage staff with non-significant reactions to be skin tested yearly.
**Screening Guidelines for School Populations**

Although routine TB screening of most school populations in Alberta is not indicated outside of on-reserve, First Nations communities, in some communities (i.e. those which continue to have higher TB infection rates than the norm) such screening may be warranted. Policies related to the need for a school testing program must be developed at the regional level, and should be based on local infection rate data.

**Recommendations for Student Screening**

Individual RHAs will direct the need for school screening, based on the incidence of disease in their own communities. It is strongly recommended that screening of the following populations receive high priority.

1. Recently arrived foreign-born students from tuberculosis endemic countries, entering the regular or post-secondary school system should be questioned about symptoms suggestive of tuberculosis, and referred as appropriate.

   ► Students who plan to remain in Canada for longer than 9 months may be screened with a TST and referred for preventive therapy as appropriate.

   There is no universal requirement for these students to present themselves for TB screening, which makes this population difficult to access. Educational institutions and schools should be encouraged to communicate with local Public Health offices regarding new students so that appropriate screening can be undertaken.

2. Children living in First Nations communities in Alberta. The First Nations and Inuit Health Branch of Health Canada, recommends routine screening of children attending school on reserve in Grade 1 and Grade 6. Children who live in First Nations communities and attend schools off reserve, may not be included in this school screening process.

**Follow-up of Significant TST in School Children**

A significant tuberculin skin test reaction in children and adolescents usually indicates recent infection. When those with newly identified significant reactions are found, a screen of the household is recommended, as this is the most likely location of the infecting source case. This is known as a source case investigation (finding the undiagnosed infectious case).
Decisions about who should be screened are based on the same criteria as for contact investigations, as identified in the concentric circle of contact investigation (see page 4-15).

► If no household cases are found, the search may need to be expanded.

► Investigate the BCG history — when was it given, were repeated vaccinations given, is documentation of vaccination available?
  - Children who were BCG vaccinated in the first year of life should be tuberculin negative after age 2 or 3 (and possibly before this). A significant reaction after this age should always be interpreted to mean that the child is infected.
  - The possibility of BCG being the cause of a significant reaction increases if BCG was given after the first year of life.

► Inquire about any symptoms.

► Refer to Tuberculosis Control or the Capital Health or Calgary TB Clinic.

► Arrange for radiograph if appropriate (regions outside Calgary and Capital Health).

### Algorithm for Routine Tuberculosis Screening of School Aged Children

**No history of active disease Mantoux history of <10mm or no previous Mantoux**

**Tuberculin Skin Test**

- **< 10mm**
  - No symptomatic persons or significant reactors found
  - **Consult with TB Control re: need for expansion of testing**
  - **No follow-up**

- **≥ 10mm**
  - Symptomatic person or significant reactor found
  - **Symptom inquiry (if not done previously)**
  - **Chest radiograph**
  - **Sputum for AFB if possible**
  - **Refer to TB Control, TB Clinic or family physician as appropriate**

*When children are identified as having a new significant tuberculin skin test, a screen of the household is recommended as this is the most likely location of the source case.*
**Screening of HIV Infected Individuals**

Tuberculosis may be a sentinel disease in the HIV infected. Although pulmonary TB may be regarded as an opportunistic infection in the HIV infected, it remains a serious public health concern for the general population as well as for other HIV infected individuals.

Because their immune systems are compromised, HIV infected individuals who are co-infected with the tubercle bacillus, have a much higher likelihood of developing TB disease than those who are not HIV infected.

Nonrespiratory disease and atypical presentations of disease are seen more frequently than in non-HIV infected populations.

During initial screening by physicians, all individuals who have a positive HIV test should be investigated for the presence of tuberculous infection and/or the possibility of active tuberculosis.

**Screening Recommendations for HIV Infected Clients**

- history and symptom inquiry
- physical exam
- chest radiograph
- sputum examination or other diagnostic tests if active TB is suspected
- tuberculin skin testing:
  - ≥5mm reaction is considered **significant** in this population, and warrants immediate referral to Tuberculosis Control or one of the TB Clinics if not previously referred. Once active disease has been ruled out, preventive therapy is strongly recommended.
  - HIV positive individuals without current active TB who have **non-significant** tuberculin tests, but who are members of high-risk groups for infection with TB represent a challenging group.
    - Information should be gathered about remote past significant skin tests. An HIV infected individual whose **previous** TST was significant, but whose **present** test is non-significant, is most likely very immunocompromised and therefore at high risk of developing disease.
    - Ongoing screening for new infection or active disease needs to be initiated and maintained.
    - Those who have been in close contact with a case of infectious TB need to be placed on preventive therapy regardless of the TST result.

**Recommendations for Staff and Volunteers**

Volunteers and staff in HIV clinics should be screened as recommended for acute care and continuing care staff.
Screening Guidelines For Foreign-Born Populations

Emigrants from countries with a high prevalence of tuberculosis are often infected with the tubercle bacillus. Even those with no evidence of active TB at the time of their emigration remain at high risk of developing tuberculosis. Approximately 60% of cases of TB in Alberta occur in the foreign-born.

Compared to tuberculosis in Canadian-born individuals, tuberculosis in the foreign-born is more likely to be drug-resistant and non-respiratory.

Immigration Surveillance

In accordance with the revised national guidelines for the investigation and follow-up of individuals who were placed under surveillance for tuberculosis after arrival in Canada, all immigration applicants, refugees, and certain visitors entering Canada are required to undergo an immigration medical examination. This is meant to identify those applicants who may pose a risk to public health, a risk to public safety or may place excessive demands on Canadian health and social services.

Immigration requires certain individuals to undergo a medical examination when they apply to move to, or stay in, Canada. Ottawa notifies provincial Tuberculosis Control of these individuals:

► those intending to work in an occupation where protection of public health is essential (e.g. teachers, nannies)
► visitors who have lived in a designated country for 6 or more consecutive months in the year preceding the date of seeking entry to Canada, and who are intending to stay in Canada for at least 6 months.
► applicants for landed immigrant status

Those who have a history of tuberculosis and those who have evidence of past disease on their chest radiographs are required to undergo medical surveillance after their arrival in Canada. This surveillance ensures that they do not currently have active TB disease, that any prior treatment was adequate, and that any need for preventive therapy is identified.

► These individuals may need to be seen, usually at the TB Clinic in either Edmonton or Calgary for an in-depth history, physical exam, and appropriate diagnostic tests.

► The immigrant will receive a letter from Tuberculosis Control or one of the TB Clinics regarding the need for assessment. A copy of the letter will be forwarded to the RHA in which the person resides, along with direction for any follow-up needed at the regional level. Public Health staff may need to assist with booking appointments.
After review by the TB Physician, one of the following decisions will be made.

1. Investigate further for active disease and treat if disease is found. Initial treatment for immigrants with active disease includes at least 4 drugs because of the possibility of drug resistance.

2. Offer preventive therapy, once active disease is excluded. It is mandatory to obtain sputum specimens before offering preventive therapy in such cases.

3. Follow for up to 3 to 5 years if preventive therapy is refused yet the immigrant is at high risk of disease, or if previous treatment was inadequate.

**Surveillance of Individuals Who Did Not Undergo Immigration Screening**

Visitors, short-term students, those with temporary working visas, and those intending to, but not yet having applied for refugee status, will not normally be part of this pre-immigration screening process. As Tuberculosis Control will seldom receive notification that they have come to Canada, no recommendations for follow-up can be made.

It is important that all health professionals seeing newcomers in these categories, particularly those from high prevalence countries, maintain a high index of suspicion for TB and investigate thoroughly by:

- inquiring about symptoms, and if disease activity is suspected, collecting sputum specimens and referring to a physician for chest radiographs or other appropriate investigations
- inquiring about past history of tuberculosis disease and/or treatments
- arranging for tuberculin skin testing for healthy individuals who may be good candidates for preventive therapy and *who plan to remain in the country for at least 9 months* so they can complete a full course of preventive therapy (if indicated).
- evaluating individuals with newly or previously significant TSTs, including a chest radiograph and sputum culture
- referring individuals as appropriate to TB Control or the Capital Health or Calgary TB Clinic for consideration of preventive therapy once active disease is ruled out
**Tuberculosis is a notifiable disease.** Cases must be reported to the regional Medical Officer of Health within 48 hours of identification. The Medical Officer of Health will in turn notify the Provincial Health Officer.

**Diagnosis**

If the following criteria are met, a diagnosis of active TB will be made:

► Patients with *Mycobacterium tuberculosis* complex demonstrated by culture (i.e. *M. tuberculosis*, *M. africanum*, or *M. bovis*—excluding BCG strain), or

► Patients with significant evidence of activity, even if there is no bacteriological proof (regardless of TST results). Significant activity includes:
  - change on a chest radiograph compatible with active tuberculosis (including idiopathic pleurisy with effusion in close contacts)
  - clinically active nonrespiratory tuberculosis (e.g. lymph node, CNS, bone and joint, genitourinary)
  - post-mortem evidence of active tuberculosis
  - pathology demonstrating caseating granulomatous disease

**Nontuberculous Mycobacteria (NTM)**

A number of bacteria in the same genus as *M. tuberculosis*, known as nontuberculous mycobacteria or NTM can be acquired through contact with various environmental sources, such as soil, water and animals. NTM disease is often difficult to diagnose. Mycobacteriology is very important.

► Infection with these mycobacteria may cause the individual to become a TST reactor.

► Individuals with NTM may be ill, and may have the same radiologic appearances as with *M. tuberculosis*. Positive smears from NTM cannot be distinguished from positive smears from *M. tuberculosis*.
Responsibilities for Management

Tuberculosis management in Alberta involves a partnership between the patient, their family (or attending) physician, their regional MOH and/or First Nations and Inuit Health Branch of Health Canada, Alberta Health and Wellness (Tuberculosis Control) and/or the Calgary and Capital Health TB Clinics.

It is essential for the control of this disease, that each of the partners takes responsibility for their role in the partnership.

Family (attending) Physician

- Is responsible for the overall clinical care of his or her patient with tuberculosis. This patient care responsibility is shared with a TB specialist from provincial Tuberculosis Control or one of the TB Clinics. Liaison with these specialists is critical.

Provincial Tuberculosis Control and/or the Capital Health or Calgary TB Clinic

- Provides consultative and/or clinical expertise to assist with diagnosis and follow-up of clients suspected of having tuberculosis.

- Makes decisions about treatment for these individuals, and assists with ensuring all cases receive appropriate treatment.

- Ensures a supply of free medication is available for treatment of disease and latent infection, and forwards this medication to the local or regional field staff for appropriate distribution to patients.

- Monitors medication adherence and adequacy of treatment, either directly, or with information provided by the local regional TB program staff.

- Communicates findings and information regarding medications, routine monitoring for side-effects, further investigations needed, etc. with family physician and regional TB program staff in the area in which the patient resides.

- Provincial Tuberculosis Control maintains a registry of all notified cases, and reports these cases nationally to CIDPC.
RHA and/or FNIHB Staff

The Medical Officer of Health, in consultation with TB Control or the Capital Health or Calgary TB Clinic, and with the assistance of local staff, ensures effective and efficient case management in the region. In addition to ensuring adequate resources are available to deliver treatment, the MOH has a crucial role in the co-ordination of staff to deliver the program, and liaison with local physicians, pharmacists, and laboratory/radiology facilities.

Well-trained Public Health or Community Health Nurses (PHNs or CHNs), working with other healthcare staff, are pivotal to the success of tuberculosis treatment and follow-up programs. They co-ordinate care in the community, ensuring that patients obtain the appropriate medication, are monitored for adverse reactions, and see physicians when necessary. Responsibilities include the following:

- Meet with the individual and family to assess their needs and to provide education regarding the disease and treatment.

- Discuss with the individual/family the need for contact investigation and begin the process of collecting names for the contact investigation list.

- Ensure appropriate isolation at home or, if necessary, in hospital if the individual is infectious (i.e. sputum smear-positive, see Appendix 17). If the individual remains at home, restrict them from public activities (going to church, shopping, or anywhere on public transportation), and also restrict access of new visitors to the home during the period of infectiousness.
  - Advise clients, if coughing, to cover their nose and mouth with disposable tissue. No special precautions need to be taken with soiled tissues, and they can be disposed of in the regular household garbage.

- Receive medication from TB Control and distribute to patients as directed.

- Ensure all medications are taken. In this regard, directly observed therapy (DOT) is considered the standard of treatment for active TB. The ultimate program goals are to ensure that:
  - all infectious patients are rapidly rendered non-infectious and asymptomatic
  - drug resistance is prevented
  - all patients complete a curative course of treatment

These goals may at times be achieved by means other than DOT.

- Monitor clients for adverse reactions to medication (including arranging for appropriate blood work, vision testing, etc.), and report reactions to the family physician and to TB Control or the TB Clinic.

- Report adherence and tolerance to medication regimen monthly, using the “Treatment Record and Follow-up Form” (see Appendix 14B).
Hospitalization

▶ Every region needs to have a contingency plan for hospitalization of TB patients who are highly infectious, have severe illness, are drug resistant or intolerant, or are nonadherent with treatment.

▶ Not all regions have isolation rooms with adequate engineering controls to prevent transmission of infection. In this case, it may mean utilizing the services of the University of Alberta Hospital which has a dedicated Tuberculosis Ward (5C3). This ward provides:
  - isolation of infectious cases using appropriate engineering controls
  - expert consultation, including dealing with drug resistance and drug intolerance
  - extensive patient education—the education team consists of expert nurses, physicians, social workers, pastoral care
  - detailed discharge planning

▶ If hospitalization is needed for an infectious case, regional staff (public health or local facility) may need to make the arrangements for transportation from the community to the facility, or from the regional facility to the provincial facility.

▶ Public transportation must not be used if the individual is infectious. Transportation must be under conditions that approximate (as much as possible) respiratory isolation. During transportation, the client and those transporting the client must wear a mask that will adequately filter the TB organism.
  - The cost of transportation is the responsibility of the referring region except when the patient is aboriginal with treaty status.
  - First Nations and Inuit Health Branch (FNIHB) of Health Canada is responsible (through the referral unit) for coverage of some non-insured health benefits for treaty status individuals living both on and off reserve. The Branch will assist with issues that arise around transporting people. For example, if an elderly person who does not speak English needs to be transferred to a facility some distance away, FNIHB will arrange for transportation, accommodations and meals for an escort when needed.

The Individual

▶ Agrees to the provision of a DOT program and negotiates with regional TB program staff as to when and where this will be carried out (e.g. clinic, home, workplace).

▶ Keeps appointments for medication administration and any follow-up needed.

▶ Reports any problems to regional TB program staff.

▶ Discloses information when indicated, to enable timely and complete follow-up of contacts.
Algorithm for PHN Responsibilities in Case Management

MOH/PHN notified about TB Diagnosis

- Initial treatment in community
  - Ensure patient and family are aware of home isolation precautions
  - Arrange for pre-treatment blood work (liaise with physician)
  - Medication sent to Public Health office by TB control

- Initial treatment in hospital
  - Assist with arrangements for transportation if needed
    (notify MOH and TB Control or TB Clinic if individual refuses admission)
  - Discharged to community

Medication dispensed as agreed upon with patient (DOT)
  - Notify TB Control if 2 consecutive doses (daily or twice weekly) are missed

Report every month (more often if necessary):
  - Symptoms of TB—cough, fever, night sweats, weight loss
  - Drug compliance—number of doses required, and number actually taken
  - Tolerance to medication:
    - Symptoms that may be due to a drug reaction
    - Results of tests done to monitor drug toxicity (for example, AST results, visual acuity and colour discrimination)

Chest radiograph (respiratory cases)—at the end of the initial phase of treatment, and following treatment completion unless otherwise ordered.

Sputum (respiratory cases)—weekly (or more often) until smear negative (on three consecutive specimens), then at the end of the initial phase of treatment and the end of the continuation phase.
Treatment of Tuberculosis Disease

Cure can be achieved in different ways, all of which include the ingestion of drugs to which the organism is susceptible.

» Collaboration between TB Control and/or the TB Clinic, family physician, Public Health services and the client will determine the best mode of treatment.

» Anti-tuberculosis drugs are always given in combination for a period of several months—M. tuberculosis is usually slow to produce disease and equally slow to respond completely to drug treatment.

» Several factors must be taken into account in determining which drugs are to be used and the length of treatment. These include:
  - the type of disease being treated
  - the drugs that are available for treatment (cases due to drug-resistant isolates will need longer courses of treatment than those due to drug-susceptible isolates)
  - patient adherence to treatment
  - potential drug interactions

Treatment Regimens

In general, treatment is divided into 2 phases as described below. As new information emerges, and new studies are completed, these phases and the regimens involved may be modified by the Provincial TB Consultant, in conjunction with the Tuberculosis Control Committee of Alberta.

Initial or Intensive Phase (also called “front-end loading”)

In accordance with the Fifth Edition of the Canadian Tuberculosis Standards, 3 or 4 drugs are given daily (using DOT) for 2 months (60 doses).

» The choice of drugs depends on drug susceptibility testing. If susceptibilities are not known at the onset of treatment, 4 drugs are usually prescribed, and adjustments are made once susceptibility test results are available.

Adherence to medication during this intensive phase is important, in that it:

» results in rapid symptomatic relief, rapid reduction in infectiousness, and reduced mortality
» reduces the possibility of the individual developing drug-resistant TB
» significantly increases the possibility that the client will complete treatment in 6 months

Maintenance or Continuation Phase

Two drugs (usually isoniazid and rifampin if the organism is susceptible) are given either daily or twice weekly using DOT for an additional 4 to 7 months. This eliminates any persisting bacteria not destroyed in the initial phase, and reduces the likelihood of relapse.
Medications Used in the Treatment of Tuberculosis

The following medications are referred to as the “first-line drugs” for the treatment of TB. They are the most effective drugs with which to combat the disease. It is important that they not be used indiscriminately. If resistance to these drugs develops, the treatment of tuberculosis is often more expensive, more complicated, and its duration is much longer.

Second-line drugs for the treatment of TB will not be discussed in any detail, as their use is still uncommon, and should always be carefully undertaken by one of the tuberculosis experts in the province. See Appendix 4 for information regarding “second-line” drugs for TB treatment. If a client is sent home on anything but the first-line drugs, information regarding administration and monitoring for adverse reactions will be discussed.

Isoniazid (INH)

Isoniazid is an active anti-tuberculous agent, which was first used in 1952. Its mode of action is still not completely understood, and it is effective only against the genus *Mycobacterium*. It is rapidly and almost completely absorbed, and peak blood levels are reached within 30 to 60 minutes after ingestion. Absorption is inhibited by the presence of food in the stomach.

There is a natural occurrence of resistance to INH in about 1 in a million organisms. The assumption is made that more than 1 million organisms must be present before TB disease is seen. Therefore, INH is always used in combination with another drug when used for treating active disease. The second drug will destroy any naturally occurring drug resistant mutants in the population of bacteria.

If infection has occurred, but no disease is detected, it is safe to assume that fewer than 1 million organisms are present, and the use of INH alone to prevent future reactivation is acceptable practice.

► INH Overdose
  • INH combines with pyridoxine (Vitamin B6) in the blood, and in high doses can rapidly deplete the body stores of Vitamin B6. This effect is seen with doses of 80-150 mg/kg.
  • Depletion of Vitamin B6 can be very serious. Early symptoms include nausea, vomiting, dizziness, slurred speech, blurred vision, dilated pupils, tachycardia, and sometimes retention of urine. Stupor, coma and seizures may then follow. These seizures, if not controlled, may lead to death from brain damage, aspiration or hypoxia.
  • The risk of overdose must always be considered in patients provided a 1 month supply of the drugs (the equivalent of 150 mg/kg if taken all at once) for self-administration.

► Treatment of Overdose
  • As soon as an overdose of INH has been recognized (even in the absence of symptoms), the same dose of pyridoxine as the dose of INH ingested should be given intravenously. For example, a child who has ingested 3.0 gm. of INH would be given 3.0 gm. of pyridoxine. If the dose of INH is not known, 5.0 gm. of pyridoxine should be given intravenously.
- This dose of pyridoxine should be repeated in 2 hours if the response to treatment has been incomplete. A total dose of pyridoxine 25gm. may be required in the first 12 hours.
- Diazepam (Valium) should be given to control seizures (2 mg by rectum for babies over the age of 6 months, or 5-10 mg intravenously for older children and adults). Phenytoin (Dilantin) should not be given as it increases levels of INH.

**Rifampin (RMP)**

Rifampin has been in general use since 1970. It acts by inhibiting DNA-dependent RNA polymerase activity in dividing cells, and is effective against mycobacterium as well as some gram positive and gram negative organisms. It is readily absorbed and reaches peak blood concentrations 2 to 4 hours after ingestion. Absorption is inhibited by the presence of food in the stomach.

When given intermittently, usual daily doses are used because intermittent high dose administration is likely to cause hypersensitivity reactions, including thrombocytopenia and anaphylaxis.

Rifampin is a liver enzyme inducer and increases the metabolism (thus decreasing the blood levels) of other drugs metabolized by the liver, such as anticoagulants, oral hypoglycemia agents, corticosteroids, oral contraceptives, phenytoin, etc. Patients on birth control pills will have to use alternate forms of birth control while on rifampin.

**Pyrazinamide (PZA)**

Pyrazinamide has been used since 1952. Its mechanism of action is unknown, but it is active only at acid pH.

Pyrazinamide inhibits the renal excretion of urates, and will often lead to high levels of uric acid in the blood. This is usually of no consequence. Rarely it may lead to acute episodes of gout in persons predisposed to gout, in which case the drug may need to be discontinued.

**Ethambutol (EMB)**

Ethambutol is bacteriostatic at low dosage (15 mg/kg) and bactericidal at high dosage (25 mg/kg). It works by inhibiting cell metabolism, causing cell death. It is active only against organisms of the genus *Mycobacterium*. It is about 75-80% absorbed after an oral dose, and reaches peak blood concentrations about 2 to 4 hours after ingestion. Absorption does not seem to be affected by food in the stomach.

Ethambutol is excreted from the body mainly in the urine. There is a fine line between the blood level needed to be effective and the toxicity level. In individuals with impaired renal function, there is marked
accumulation of medication in the system. For this reason, renal function (serum creatinine) should be measured before beginning treatment.

Ethambutol may cause optic neuritis (about 6% of patients), with decreased visual acuity and loss of red-green colour discrimination. These effects are uncommon at the lower dosage (15 mg/kg), and for this reason, dosages are usually reduced after the initial phase of treatment. They are usually reversible when detected early and the drug is discontinued promptly.

► Visual acuity and red-green colour discrimination should be tested monthly while on treatment, and the client should be advised to report promptly any changes in vision.
► Because these changes may be unilateral or bilateral, each eye must be tested separately and both eyes tested together.

**Streptomycin (SM)**

Streptomycin was discovered in 1944. It works by interfering with the bacterial cell proteins. It is not absorbed from the gut, and is therefore only given in parenteral form. Peak blood concentrations are reached about 1 to 2 hours after administration.

Streptomycin is excreted from the body mainly through the urine. In individuals with impaired renal function, it will accumulate and may reach dangerously high blood levels. For this reason, individuals with any renal impairment need to be monitored very closely.

There is risk of eighth nerve toxicity with the administration of streptomycin (especially in the presence of renal impairment). This may lead to permanent loss of inner ear function. Symptoms include nausea, vomiting, vertigo, nystagmus and ataxia, tinnitus, and varying degrees of hearing impairment. Monthly audiograms are necessary. Streptomycin is also teratogenic to the fetus’s eighth cranial nerve, and should not be used in pregnancy.
<table>
<thead>
<tr>
<th>Drug and Daily Dose</th>
<th>Twice Weekly Dose</th>
<th>More Common Side-Effects</th>
<th>Less Common Side-Effects</th>
<th>Monitoring</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Isoniazid (INH)</strong></td>
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<tr>
<td>Supplied: Tablets - 100 and 300 mg</td>
<td>Adult 900 mg</td>
<td><strong>hepatotoxicity</strong> (nausea, vomiting, abdominal discomfort, anorexia, fatigue) accompanied by increased transaminase (AST, ALT) levels</td>
<td><strong>peripheral neuropathy</strong> (controlled by co-administration of pyridoxine)</td>
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<td>(to max. 300 mg/day)</td>
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<td>Child 15-30 mg/kg</td>
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<td></td>
<td>(to max. 300 mg)</td>
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<td>Dose:</td>
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<tr>
<td>Adult: 5-10 mg/kg</td>
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<td></td>
<td>Exclude interactions with other medications.</td>
</tr>
<tr>
<td>(to max. 300 mg/day)</td>
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<td></td>
<td>If Dilantin is co-administered with isoniazid, the Dilantin level will be increased and dosage needs to be adjusted accordingly.</td>
</tr>
<tr>
<td>Child: 5-10 mg/kg</td>
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<td>Consider overdose potential.</td>
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<tr>
<td>(to max. 300 mg)</td>
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<p>| <strong>Rifampin (RMP)</strong> | | | | | |
| Supplied: Capsules - 150 and 300 mg | Adult 600 mg | <strong>hepatotoxicity</strong> (as with INH) | <strong>hypersensitivity</strong> | | |
| Syrup formulated from capsules—10 mg/ml | | | | | Exclude interactions with other medications (e.g. decreased effectiveness of birth control pills). |
| (Parenteral formulation also available) | | | | | Orange discoloration of tears will stain soft contact lenses; sweat can stain white shirts. | |
| Dose: | | | | |         |
| Adult: 10-20 mg/kg | | | | |         |
| (to max. 600 mg/day) | | | | |         |
| Child: 10-20 mg/kg | | | | |         |
| (to max. 600 mg) | | | | |         |</p>
<table>
<thead>
<tr>
<th>Drug and Daily Dose</th>
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<th>Less Common Side-Effects</th>
<th>Monitoring</th>
<th>Comments</th>
</tr>
</thead>
</table>
| **Pyrazinamide (PZA)**  
*Supplied: Tablets - 500 mg*  
*Dose: Adult: 15-30 mg/kg (to max. 2000 mg/day)*  
*Child: 15-30 mg/kg/day (to max. 2000 mg)* | Adult: 50-70 mg/kg (to max. 3000 mg/day)  
Child: 50-70 mg/kg (to max. 2000 mg/day) | • hyperuricemia  
• arthralgia | • hepatotoxicity  
• photosensitivity  
• gout | • See “PZA Preventive Therapy Fact Sheet” see page 6-19  
• transaminase levels as with INH and Rifampin  
• uric acid if gout is suspected | Exclude interaction with other medications.  
Not recommended in pregnancy. |
| **Ethambutol (EMB)**  
*Supplied: Tablets - 100 mg and 400 mg*  
*Dose: Adult: 15-25 mg/kg (to max. 2500 mg/day)*  
*Child: 15-25 mg/kg/day* | Adult and child 50 mg/kg | • retrolbulbar neuritis  
• nausea | • slight uric acid elevation  
• baseline visual acuity and colour discrimination  
• repeat visual acuity and colour discrimination monthly | Exclude interactions with other medications.  
Report any visual changes immediately. |
| **Streptomycin (SM)**  
*Supplied: Vials– 1000 and 4000 mg (Parenteral formulation only)*  
*Dose: Adult: 15-20 mg/kg IM (to max. 1000 mg/day)*  
*Child: 20-40 mg/kg IM (to max. 1000 mg/day)* | Same as daily dose  
Same as daily dose | • 8th nerve toxicity, esp. vestibular  
• hypersensitivity reactions  
• nausea | • nephrotoxicity  
• numbness and tingling around mouth | • symptoms  
Baseline and then monthly:  
• Urea  
• Creatinine  
• audiogram | Report balance problems or vertigo promptly.  
If renal impairment, monitor closely.  
Reduce dose in older patients.  
Do not give during pregnancy. |
Directly Observed Treatment (DOT)

Directly Observed Treatment is the most effective strategy available for assuring adherence to treatment. It means:

- making sure that all doses of medications are taken and swallowed in the presence of a trained observer
- documenting that all medications have been taken, and recording any side-effects observed

DOT is the recommended method, and is considered the standard of medication delivery in Alberta for all cases of TB. Recommendations for DOT are not based on the assumption that any particular patient may be non-compliant with treatment. But treatment regimens are always long, require the patient to take more than 1 drug, must continue long after the patient feels well, and may even make them feel a little unwell. Even the most motivated individual often has difficulty completing a full treatment regimen under these circumstances.

DOT is a strategy which is supported by the World Health Organization. It is becoming widely used worldwide, as more countries develop the capacity to detect TB and provide medications to all who need it.

DOT must always be used when the individual:

- has sputum smear-positive pulmonary TB – this individual is considered very infectious, and therefore a public health risk
- has TB and HIV co-infection
- is on intermittent drug treatment
- is known to be non-adherent with treatment regimens – these individuals are at higher risk of developing drug-resistant tuberculosis
- has mental health problems which would lead the practitioner to question either the ability of the individual to be adherent, or the safety of self-administered treatment
- has multi-drug resistant TB

The Benefits of DOT

When explaining to clients the need for DOT, the following points may be used.

- DOT encourages successful completion of treatment by providing assistance with taking the medication.
- With DOT, most clients only need to take their medicine 2 or 3 times each week in the continuation phase, and sometimes for a portion of the initial phase.
  - The regime will often be shorter than for daily, self-administered treatment (example—6 months instead of 9 months).
- The person providing DOT makes sure the client is going for regular check-ups, watches for side-effects and provides TB information.
- DOT gives the client the opportunity to ask questions and reduce fears about TB and its treatment.
- DOT will improve the likelihood of permanent cure.
- DOT will reduce the likelihood of acquired drug resistance.
- DOT will also allow for the rapid identification of those who abscond.
Program Considerations

Treatment regimens are always long and often place some restrictions on individuals’ lifestyles and sometimes, even work life. Because of the importance of adherence to treatment, it is imperative that those delivering treatment be flexible, and negotiate with patients to achieve the best outcome. Issues such as where and when medications will be delivered are important. Sometimes it is best for the patient to present to the health centre, sometimes home visits work best, and sometimes the local park or coffee shop is the best solution. Decisions must be made taking both the patient’s and the pill dispenser’s needs into account.

The Public or Community Health Nurse (PHN or CHN) always provides for the delivery of medication to the patient, and watches him/her swallow them.

- Once the patient is established on DOT, another responsible person in the community (e.g. CHR, teacher, neighbour, etc.) often can be trained to supervise the taking of medication.
- Pill dispenser manuals are available from Alberta Health and Wellness to assist in the training of community pill dispensers.
- Care must be taken in the selection of these individuals. The nurse must ensure that the community pill dispenser is:
  - responsible, and will deliver and observe the swallowing of each dose
  - capable of monitoring, documenting and reporting side-effects to the PHN/CHN
  - acceptable to the patient
  - not in a position to be influenced by the patient (e.g. family member, employee)

The nurse retains the ultimate responsibility for ensuring that the treatment regimen is followed, adverse reactions are monitored, and necessary lab work is done. Because of this, frequent meetings with the pill dispenser, and at least monthly meetings with the patient are recommended.

Each case should be reviewed with the pill dispenser frequently (every week to 2 weeks) by the PHN/CHN.
Monitoring for Adverse Effects of Treatment

Before Beginning Treatment

The following baseline measurements are necessary to properly prescribe treatment and allow for subsequent documentation of toxicity:

- Hepatic enzymes (AST, ALT and Bilirubin)
- CBC, WBC and platelet count
- Serum creatinine
- Serum glucose
- Urinalysis
- Visual acuity and red-green colour discrimination if ethambutol is prescribed
- Audiometry if streptomycin is prescribed
- HIV serology

Routine Monitoring Once Treatment Has Begun

All clients on medication need routine monitoring to assess adverse effects from the medication. Each time medication is dispensed, assessment for symptoms relating to adverse reactions from the particular medications should be performed. In general, the blood work monitoring of patients on INH, rifampin or pyrazinamide are similar to those outlined on the preventive therapy fact sheet available for each of the drugs (see Appendices 5, 6, 7 and 8).

Other recommendations regarding monitoring for specific adverse effects and any blood work that needs to be done will be specified in the “action column” of the Update Form that will accompany the medication on delivery to the health centre. In older patients, or patients with underlying liver disease, more frequent monitoring of blood work (e.g., every 2 weeks) at the discretion of the tuberculosis consultant, may be necessary.

Symptoms suggesting treatment failure or drug toxicity, and any abnormal blood work need to be reported to the family physician and to TB Control or the Capital Health or Calgary TB Clinic.
Monitoring Response to Tuberculosis Treatment

Clinical Response

Most patients will have an excellent response to treatment, and will become asymptomatic within a few weeks. For example, fever usually resolves within 2 weeks of effective treatment. Regular inquiry for symptoms of tuberculosis must be carried out on any individual being treated for tuberculosis.

► If the individual remains symptomatic or symptoms recur (see page 2-6), report this to the family physician and TB Control or the Capital Health or Calgary TB Clinic.

Bacteriological and Radiological Response

The following are general guidelines for determining response to treatment of tuberculosis. Depending on the individual circumstances, patient specific recommendations for monitoring will be provided by Tuberculosis Control or the Capital Health or Calgary TB Clinic.

Respiratory Case Follow-up

Sputum

► At the outset, if the case is smear-positive from airway secretions, collect sputum specimens until at least 3 consecutive specimens, on 3 different days are smear-negative.
► Once smears have converted to negative, collect at the end of the initial phase of treatment, and at the completion of the continuation phase.
► Collect specimens 6 and 12 months after treatment is completed, to ensure cure has been achieved.

Chest Radiograph

► The interval between radiographs depends on the site of disease and the clinical circumstances.
► Respiratory cases will require radiographs at least twice: at the end of the initial phase of treatment (approximately 2 months) and at the end of treatment.
  • Follow-up radiographs will be done 6 and 12 months after treatment completion.

Non-respiratory Case Follow-up

Following completion of treatment, individuals with non-respiratory tuberculosis will need a chest radiograph, sputum examination, and a physical assessment by the family physician to determine response to treatment.

Twelve months following the end of treatment, the patient should be re-evaluated by the family physician to ensure there has been no relapse of disease. This re-evaluation must consist of, at minimum, a physical examination of the site of disease. If the physician has any concern about the possibility of relapse, or any question of the reliability of history of adequate treatment, a chest radiograph and sputum examination for AFB may be requested.
Drug-resistant Tuberculosis

It is uncommon to find resistance to first-line anti-tuberculosis drugs in isolates from Canadian-born TB patients. On the other hand, isolates from foreign-born TB patients are uncommonly resistant to 1 or more first-line drugs, most often isoniazid and/or streptomycin. Because the foreign-born constitute an increasingly large proportion of TB patients in Canada, the proportion of all *M. tuberculosis* isolates in Canada that are drug resistant is increasing. Drug resistant TB is generally more difficult to treat.

**Drug resistance in tuberculosis can be classified into 3 types:**

- **Primary drug resistance** — when previously untreated individuals are found to have drug-resistant organisms. Primary resistance results when an individual is infected by someone who has drug resistant TB disease.
- **Acquired drug resistance** — when individuals who initially have drug susceptible tubercle bacilli later become drug-resistant. This is usually due to inadequate, inappropriate, or irregular treatment or, more importantly, due to non-adherence in taking the prescribed medication.
- **Initial drug resistance** — when drug resistance is reported in individuals who deny previous chemotherapy but whose prior drug use history cannot be confirmed.

**Isolates may be resistant to a single first-line drug, or to a combination of drugs.**

- Isolates resistant to a **single drug** are most often resistant to isoniazid, and there are effective alternatives for the treatment of these cases.

- **Multi-drug resistant tuberculosis** (MDRTB) refers to resistance to at least isoniazid and rifampin. The treatment of MDRTB usually requires the use of second-line drugs (see Appendix 4).
  - Second-line drugs for the treatment of TB are known to be less effective, more expensive and may have many more adverse reactions than the first-line drugs.
  - Treatment regimens for MDRTB must be individualized, but in general, 4 to 6 drugs are given over an extended period of time, and every dose **must** be directly observed to have been taken (daily or even several times a day).
  - When patients are sent home on any of these second-line drugs, information about the medication, adverse reactions and monitoring should be provided to the staff in the field.

Important strategies to reduce the development of resistance include:

- **central co-ordination of the TB Program**, including monitoring and provision of TB drugs, to ensure adequate treatment supply
- **directly observed therapy** to ensure adherence to the prescribed regimen
- **treatment of TB disease** with at least 2 (and preferably 3) drugs to which the organism has been demonstrated to be susceptible
- **never introducing a single drug to a failing regimen**

Prevention of drug resistance must be given high priority when treating tuberculosis.
Resistance to antituberculous medication should be considered when treating:

- foreign-born persons from TB endemic countries or Canadian-born individuals who have recently resided in a country with a high prevalence of TB
- anyone who has previously been treated for tuberculosis or received preventive therapy for latent TB infection
- contacts of an individual who is known to have (or thought to have) drug-resistant tuberculosis
- individuals who have cavitary pulmonary TB. These patients are thought to be more prone to drug resistance because they harbour greater numbers of bacilli
- anyone whose treatment is failing including:  
  - patients who, while on treatment, remain smear-positive after the fifth month of treatment
  - patients who are initially smear-negative and become smear-positive after the second month of treatment
  - patients whose cultures remain positive after the fifth month of treatment

- rarely when one or more drugs are malabsorbed, or when all are absorbed but one or more drugs fails to penetrate the tuberculous lesion

**Tuberculosis in Infants and Children**

Tuberculosis in infants and children is more likely to manifest itself in life-threatening nonrespiratory forms such as central nervous system TB and disseminated TB. Therefore, it is critical to make an early diagnosis and commence treatment promptly.

- TB disease in infants and young children is rarely infectious, but almost always indicates a recent infection. Contact-investigation is aimed primarily at finding the source of the child’s infection, and is called a “source case investigation.”

- When dealing with children who have a cough and who are old enough to follow instructions, sputum collection should be attempted. However, because adequate sputum specimens are very difficult to collect from young children, gastric aspiration is often necessary (see Appendix 3C).

**Isolation of Cases of Tuberculosis**

All patients who are admitted to active treatment facilities with suspected or confirmed infectious TB must immediately be isolated until proven to be non-infectious.

- If no isolation room meeting the criteria for respiratory isolation is available, arrangements should be made to transfer the patient to a facility that has rooms that meet such criteria. (For isolation room criteria, see “Guidelines for Preventing the Transmission of Tuberculosis in Health Care Facilities and Other Institutional Settings,” pages 15-17.)
► If there is a delay in transfer, the patient must be kept in a separate room with the door closed, and anyone entering must wear a mask that is capable of filtering 95% of particles of 1 micron or larger.

► Any time the patient needs to leave the room, he or she must wear a mask.

**Management of Recalcitrant Persons**

Recalcitrant persons are defined as those individuals who are unwilling or unable to take appropriate precautions to prevent transmission of the diseases listed in Schedule 3 of the “Communicable Diseases Regulation.” This includes those with a diagnosis of active tuberculosis. They pose a risk to the health of the public.

A stepped intervention must be used in dealing with recalcitrant persons. For the purposes of ensuring adequate treatment of active tuberculosis and protecting the public, the following steps apply:

**Step 1** If the client misses 2 consecutive doses of medication while on twice weekly high dose treatment (or the equivalent if on daily medication), notify the MOH or designate (TB co-ordinator) and Tuberculosis Control or the TB Clinic.

**Step 2** The MOH or designate will attempt to determine if the patient is unwilling or unable to take the medication.

**Step 3** Through negotiation with the patient, the MOH or designate will attempt to re-establish the medication regimen.

**Step 4** If these steps fail, the MOH, in consultation with the Provincial TB Consultant will issue an order for detention under the *Public Health Act*.

“Detention” could be anything from a supervised group home to a secure ward in a health care institution, and will be decided on an individual basis.
CONTACT INVESTIGATION
Contact investigation refers to the assessment of individuals who have been in contact with a recent case of active tuberculosis in order to identify new infections. If the index case has primary or nonrespiratory TB, the investigation is carried out to attempt to identify a source case amongst the contacts.

The goals of a contact investigation are to identify:

► secondary cases of TB disease following exposure, and to initiate treatment as soon as possible
► those who may be newly infected, and to prevent the development of active tuberculosis in these individuals
► the source of the new infection (referred to as a source case investigation)

**When is a Contact Investigation Necessary?**

Whenever a patient is found to have, or is suspected of having active tuberculosis, a contact investigation to determine those at risk of being newly infected should always be initiated.

Contact investigation is the responsibility, under the *Public Health Act*, of the regional MOH who works collaboratively with TB Control or the TB Clinic and co-ordinates staff in regional settings as appropriate.

Contact investigation should begin as soon as TB has been diagnosed. The initial list of the known contacts should be submitted to Tuberculosis Control or the local TB Clinic on the “Master Contact List” within 7 days of notification of the case. This form is used to track and co-ordinate follow-up, and therefore it is imperative that information be as complete as possible (see Appendix 14G).

**Children**

Active tuberculosis in young children is rarely infectious, but it signals a recent infection and indicates the probability of an undiagnosed infectious case amongst the child’s close contacts.

► A source case investigation should always be carried out, as the individual who transmitted the disease may still be undiagnosed and infectious.

► Older children, adolescents and adults with respiratory TB should also have sputum specimens submitted in order to evaluate degree of infectiousness.
**Priority for Initiation of Contact Investigation**

Whenever a case of tuberculosis is diagnosed, either clinically or with laboratory confirmation, decisions (in consultation with TB Control staff or TB Clinic staff) must be made regarding initiation of contact investigations.

Because young children with tuberculosis rarely transmit infection to others and are likely to have been infected recently, investigation is aimed at identifying the source of their infection. If assessment of the child indicates infectiousness, a broader contact investigation may be necessary.

Priority for the initiation of contact investigation should be as follows:

<table>
<thead>
<tr>
<th>Site</th>
<th>Bacteriology</th>
<th>Action</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pulmonary (usually cavity)/laryngeal</td>
<td>AFB sputum smear-positive</td>
<td>Conduct contact * investigation</td>
<td>High</td>
</tr>
<tr>
<td></td>
<td>Culture positive</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pulmonary/ laryngeal</td>
<td>AFB sputum smear-positive</td>
<td>Commence contact investigation (if culture is not TB and clinical TB ruled out, stop contact investigation)</td>
<td>High</td>
</tr>
<tr>
<td></td>
<td>Culture pending</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pulmonary/ laryngeal</td>
<td>AFB sputum smear-negative</td>
<td>Conduct contact investigation of household and other close contacts</td>
<td>Lower than AFB sputum smear-positive</td>
</tr>
<tr>
<td></td>
<td>Culture positive</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pulmonary/ laryngeal</td>
<td>AFB sputum smear-negative</td>
<td>Commence contact investigation if strong clinical suspicion (may discontinue if culture result negative)</td>
<td>Lower than AFB sputum smear-positive</td>
</tr>
<tr>
<td></td>
<td>Culture pending</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pulmonary/ laryngeal</td>
<td>AFB sputum smear-negative</td>
<td>Commence contact and/or source case investigation of household and other close contacts only; if clinical TB is ruled out, stop contact investigation</td>
<td>Low unless repeated cultures change to positive</td>
</tr>
<tr>
<td></td>
<td>Culture negative</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(Clinical diagnosis only)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-respiratory</td>
<td></td>
<td>Contact and source case investigation of close contacts only</td>
<td>Low</td>
</tr>
</tbody>
</table>

* This means contact or source case investigation, as appropriate.
Conducting a Contact Investigation

Any successful contact investigation requires careful attention to detail in the gathering and evaluation of information. While contact investigation does not always follow this order, the following steps should assist the regional TB program staff to ensure the necessary information is gathered:

▶ index case medical information review
▶ patient (index case) interview
▶ field investigation
▶ risk assessment for *M. tuberculosis* transmission
▶ decision about priority of contacts
▶ evaluation of contacts (high-risk, medium-risk, low-risk)
▶ follow-up of contacts
▶ decision about whether to expand testing (the concentric circle approach)
▶ evaluation of contact investigation activities

Medical Information Review

Review of medical information pertaining to the index case is crucial to making the decision regarding which contacts are at risk of infection with *M. tuberculosis*. This information is usually gathered by TB Control or the local TB Clinic through discussion with the regional MOH, the provincial laboratory, the physician, and/or the admitting hospital. The following information is important in deciding which contacts are most at risk of infection.

Probability of Infectiousness

The probability of infectiousness is dependent on the following:

▶ site of tuberculosis disease (respiratory vs. nonrespiratory)
▶ tuberculosis symptoms (particularly cough), and approximate date symptoms began
▶ sputum smear and culture results, including the dates of specimen collection
▶ chest radiograph results and date (cavitary pulmonary disease is usually very infectious)
▶ tuberculosis treatment (medications, dosage, and date treatment was started, DOT or self-administered)

Period of Infectiousness

The period of infectiousness begins with the onset of symptoms (especially coughing), and ends when all the following criteria are met:

▶ symptoms have improved
▶ the client has been receiving adequate treatment for at least 2 to 3 weeks
▶ the client has had 3 consecutive negative sputum smears, from sputum specimens collected on 3 different days
The Interview

The patient interview is one of the most crucial parts of the contact investigation because it is used to develop a list of those who are at risk for infection. It should be conducted by experienced TB program staff, and several interviews will probably be necessary to ensure complete information is received. The following strategies will assist in developing excellent interview skills:

► explain to the patient the importance of the contact investigation for preventing and controlling TB
► ensure that the interview takes place under conditions that encourage effective communication and ensure confidentiality
► establish the foundation for a good relationship with the patient, based on mutual trust and understanding
► begin an assessment of the patient’s knowledge, feelings, and beliefs about TB and educate the patient
► ask open-ended questions
► have a clear understanding of the objective of the interview
► plan the interview so that each objective is given adequate time
► listen to the patient’s concerns about TB and its treatment
► share information freely with the patient

The initial interview should occur as soon as possible after the case is reported, and is therefore often done in hospital. The purpose of this interview is to find out more about the patient’s symptoms to help define the period of infectiousness, to find out places where the patient spent time, and to identify the patient’s contacts. Follow-up interviews are important to ensure accuracy of information, and are done by the most appropriate person at the time (e.g. facility infection control nurse, PHN, CHR, physician, etc.).

An interview checklist (see page 6-48) will assist the interviewer to ensure all the necessary information is gathered.

Interpreters may be needed if language is a barrier. Care must be taken in the choice of interpreters, being sensitive to issues of confidentiality (a family member or close friend may not always be the best choice).

Symptoms

Ask about any symptoms, but especially about cough or hoarseness, and how long these symptoms have been present. This will assist in determining how long the patient has been infectious.

► Difficulty recalling onset of symptoms can sometimes be helped by asking the patient to relate symptoms to events such as birthdays, holidays, major news events.
► With the patient’s approval, family members or other persons who live in the same home may be interviewed to help estimate onset of symptoms.

Hoarseness may be an indication of laryngeal TB. The presence of a cough indicates a greater likelihood of spreading infection.
Places

Ask the patient to identify all of the places that they have been since the symptoms began, especially places where they spent the most time.

► This may be a difficult task, which may be made easier by asking the individual to go over their daily routine at home, work or school, and in leisure or recreation activities.
► Ask the individual to think about other places that they have been less frequently, such as parties, meetings, family gatherings.
► It is also important to get information about the characteristics of each place, such as size, time spent there, and ventilation. This information is important to determine the risk of transmission of *M. tuberculosis*.

Contacts

Every TB patient has at least 1 contact, and some may have hundreds.

Ask the patient to give names, dates of birth, addresses and telephone numbers of any individuals they have spent time with in each of the places that they have identified, especially those they see daily. Special emphasis must be given to whether or not the source case has had any close contact with infants or children.

Completing the Interview

At the end of the interview, the decision should be made about who will notify the contacts about the need for follow-up.

► The patients may want to notify some contacts themselves, especially those who are family or close friends. If notification is to be done by the patient, inform them that the nurse will have to follow any contacts who do not present for testing.
► If TB program staff are to do the notification, the patient should be reassured that notification will only be done under strict guidelines of confidentiality, and that contacts will not be told who named them as a contact.
► The interviewer should be aware that there might be some contacts that the patient is reluctant to identify and others who the patient has forgotten during the initial interview.
► Follow-up interviews should be scheduled when time permits, and the interviewer should ensure the patient knows how to reach them if further names are recalled at a later date.
Field Investigation

Undertaking a field investigation means visiting the patient’s home, workplace or school, and the other places where the patient spent time while infectious.

The purpose of the field investigation is to identify contacts of an individual with tuberculosis disease and evaluate the environmental characteristics of the place where exposure occurred. During the field investigation, the health care worker should:

► observe environmental characteristics of the space (size, crowding, ventilation)
► identify additional contacts (especially children) and their phone numbers and addresses
► look for evidence of other contacts who may not be present at the time of the visit, and who the patient has not previously identified (Pictures of others who may live in or visit the home frequently, shoes of others who may live in the home, toys left by children, etc. may help identify others who have been in contact.)
► interview and skin test close contacts who are present and arrange for reading of the results
► educate the contacts about the purpose of a contact investigation, the basics of transmission, the risk of transmitting M. tuberculosis to others, and the importance of testing, treatment, and follow-up for TB infection and disease
► refer contacts who have TB symptoms for evaluation

Risk Assessment for M. tuberculosis Transmission

Assessing the risk of transmission helps determine which contacts should be given high priority for testing and evaluation. Information gathered during the medical information review, the patient interview, and the field investigation are used during this assessment.

Tuberculosis is an infectious disease transmitted almost exclusively by the airborne route. The risk to contacts of transmission of tuberculosis from an individual with pulmonary tuberculosis depends on the following factors.

The infectiousness of the source case, which is determined by the following:

► The site of tuberculosis disease. For example, pulmonary TB, particularly cavitory pulmonary TB and laryngeal TB are infectious, while lymph node TB is not.
► Tuberculosis symptoms — especially those that cause aerosolization of sputum (cough).
► Results of sputum smear and cultures for acid-fast bacilli (AFB).
  • Individuals whose sputum is “smear-positive” are highly infectious.
  • Those whose sputum is “culture-positive” but “smear-negative”, are less infectious but are still capable of spreading infection.
► Findings on chest radiographs. A cavitory lesion suggests disease that is highly infectious.
► Tuberculosis treatment. The degree of infectiousness decreases rapidly once appropriate medications are administered and adhered to. Just how appropriate the medications are may not be certain until the drug susceptibility test results are available.
The environment where transmission likely occurred

- The risk of transmission depends on the concentration of infectious droplet nuclei in the air shared by the case and their contacts. Concentration will be higher in a small, enclosed, poorly ventilated room with little exposure to sunlight than in a large, well-ventilated one.

The frequency and duration of exposure

- No definition of “significant duration of exposure” can be applied in all cases. It depends on how highly infectious the case is, the type of exposure the contacts have had, and the susceptibility of the contacts. This must be assessed with each case.

The susceptibility of the contact may also have an impact on the assessment of risk to individuals following TB exposure.

- Individuals with no prior exposure to *M. tuberculosis* are at increased risk of infection when in contact with an infectious case of TB.
  - It is important to appreciate that BCG vaccination does not reduce the risk of infection. Its value is in reducing the risk of disease once infection has occurred.
  - Prior infection or disease is believed to reduce, but not entirely remove, the risk of re-infection.
  - It is possible that certain racial groups (for example African Americans) are at increased risk of infection after exposure.

Assigning Priority for Investigation of Contacts

In order to make the most efficient use of resources, initial contact investigation should be focused on those individuals most at risk of acquiring tuberculosis infection and developing tuberculosis disease, and expanded as necessary.

The highest priority for testing should be given to contacts who are most likely to be infected, as assessed during the risk assessment for transmission of *M. tuberculosis*, especially those who are at high risk of developing disease if infected. This usually means children less than 6 years of age, and those who are severely immunocompromised such as the HIV infected.

- When TB is diagnosed in young children, it indicates new disease, and undiagnosed infectious tuberculosis in the home or community should be suspected. Every effort should be made to identify the undiagnosed case who has infected this child.
Evaluation and Management of Contacts

Evaluation of contacts for tuberculosis infection and/or disease needs to be carried out in an orderly manner, beginning with those at highest risk.

The provincial tuberculosis Contact Investigation Co-ordinator, or the Calgary or Capital Health TB Clinics, should be consulted when planning a contact investigation. They have access to the “broad picture” provincially, and can assist with compiling information from all regions. Also, they often have information that will assist with the determination of risk. Communication with them (written and/or verbal) should be maintained throughout the investigation to ensure appropriate activities are undertaken.

In many cases, contacts of infectious individuals do not all live within one health region, and assessment of the spread of infection can be difficult. The provincial tuberculosis Contact Investigation Co-ordinator can provide a cross-regional and inter-provincial perspective of the ongoing evaluation of contacts and should therefore be included in decisions regarding contact investigation activities. This means:

- submission of contact lists as contacts are identified (within 7 days of notification of the case)
- information about the whereabouts of named contacts who have moved or live in a different jurisdiction
- reporting all investigation activities as they are completed. The identification of secondary cases and converters will necessitate the expansion of the contact investigation.
- reporting compliance with recommendations for follow-up and/or treatment
- joint evaluation of the contact investigation activities (with the co-ordinator) to determine when follow-up is complete

Evaluation Tools

As with screening programs, contact investigation programs rely on several tools to assist with the evaluation of individuals. These tools include:

- medical history, including symptom review
- tuberculin skin test (TST), except where documentation of a previous significant reaction exists
- chest radiograph
- sputum examination when indicated
Medical History

Information gathered by asking the contact about the following will assist in the evaluation of the need for further investigation:

- **documented** previous significant tuberculin skin test
  - Sometimes there is no history of a documented previous significant reaction, but the client describes a reaction that sounds “significant.” In this instance, a history of probable prior exposure will assist in the decision whether or not to administer a TST.

- past history of tuberculosis disease
- previous treatment for tuberculosis infection or disease
- previous exposure to tuberculosis
- risk factors for developing tuberculosis disease (especially HIV risk factors)
- current symptoms of tuberculosis, such as persistent cough (especially if productive), fever, night sweats, weight loss, fatigue
  - **Contacts with symptoms consistent with tuberculosis have priority over all other contacts** and should have a chest radiograph and 3 sputum specimens submitted for AFB smear and culture immediately. A tuberculin skin test is administered unless there is a history of a previously significant reaction. Refer to the family physician or the TB Clinic for evaluation.

Tuberculin Skin Test (TST)

Background Information

The tuberculin skin test is a useful tool for identifying individuals who have been infected with the tubercle bacillus, although it does not indicate whether the infection is recent, or remote (the individual was infected many years past), nor does it indicate whether the person has disease or not.

To identify those who have been infected, but tested negative during the initial screening, a repeat TST is required 8 to 12 weeks post-contact. Normally, it takes 2 to 8 weeks after tuberculosis infection for the body’s immune system to react to tuberculin.

Infected individuals whose immune system is immature or depressed (e.g. HIV infected individuals), infants up to 6 months of age, and those with active tuberculosis disease may not mount a response to the TST. Therefore, a thorough investigation needs to be initiated, and these individuals must be reported to TB Control urgently, regardless of TST reading.

During a contact investigation, individuals who have a significant TST with no prior history of a significant TST are assumed to have been recently infected.

Contacts with a previous significant reaction should not be skin tested again. Investigation should follow the protocol for other significant TST reactors.
Tuberculin skin testing should be performed on contacts determined to be at risk, who have no documentation or description of a previously significant reaction. A single TST should be administered at this time.

The results of this initial tuberculin skin test will assist in the determination of the need for further screening activities. If this TST is read as:

**Non-significant (<5 mm.)**

Contacts who are healthy, should have a repeat TST 8-12 weeks after the last exposure to the infectious case. The result of this follow-up TST will help to further define the necessary investigations.

- If the reaction to the second test remains non-significant and the individual remains healthy, no further follow-up is required.
- Converters must be investigated further (follow protocol for significant reactor, see page 2-10) to rule out tuberculosis disease. They are assumed to have been recently infected by the tubercle bacillus, and are therefore at greater risk for development of tuberculosis disease.

Close contacts whose initial TST result is non-significant, but who are infected with HIV, or are under the age of 6 years, are at very high risk of development of TB disease if they have been infected. They should be referred immediately to TB Control or the TB Clinic for further investigation, and considered for preventive therapy.

**Significant (≥5 mm.)**

Further investigation including a chest radiograph and sputum investigation is needed to rule out TB disease.

**Chest Radiographs**

The radiograph is another crucial tool in the contact investigation protocol. When used in conjunction with the TST result, it is of great assistance to the TB physician in the assessment of the individual for tuberculosis infection or disease. These radiographs should be requisitioned using the “TB Referral Form” (see Appendix 14C) to ensure they are forwarded to TB Control or the Calgary or Capital Health TB Clinic for interpretation.

Chest radiographs should be ordered (as recommended by TB Control or the TB Clinics) on contacts who:

- have a significant TST reaction
- are HIV positive (regardless of TST reaction)
- are children under the age of 6 years who are close contacts of infectious tuberculosis (regardless of TST reaction)
Sputum Investigation

The examination of sputum for AFB is the most cost-effective tool for the identification of undiagnosed secondary cases. Not only are the results available within a very short time, but this specimen can be easily collected in the client’s home.

Any contact who has an abnormal chest radiograph or who has TB symptoms, particularly a productive cough, must have 3 sputum specimens submitted to the laboratory for AFB smear and culture, regardless of the results of the TST.

Efforts should always be made to collect at least 1 sputum specimen for AFB on all contacts who have a significant TST. Contact investigators should carry a supply of sputum containers with them whenever they are conducting an investigation. Collect 3 sputum specimens on symptomatic contacts.

Sputum induction or gastric aspirates may be needed in the case of contacts who have difficulty producing sputum, (e.g., young children or the elderly) who are suspected of having tuberculosis disease (see Appendix 3).

Preventive Therapy

Preventive drug therapy (now referred to as treatment of latent TB infection) should be considered for all close contacts of infectious cases who have significant TST results.

High-risk contacts, even with a non-significant TST reaction (e.g., children < 6 years of age, the HIV infected, or others who are severely immunocompromised), should start preventive therapy as soon as possible after exposure once active disease is ruled out.

► If the follow-up TST at 8 to 12 weeks indicates no TB infection has occurred, this treatment, depending upon the circumstances, may be discontinued. Preventive treatment in close, HIV infected contacts is usually continued regardless of the results of the follow-up TST, as the individual may be anergic.

► If follow-up at 8 to 12 weeks indicates TB infection has occurred, treatment will be continued.

Under certain circumstances, casual contacts may also be offered preventive therapy.

When preventive therapy is not accepted or completed, a repeat chest radiograph and sputum for AFB smear and culture at 12 months post-exposure is required for all contacts thought to be infected (whether recently or in the remote past) who do not complete a full course of preventive therapy.

► All individuals who are documented converters who do not complete a full course of preventive therapy will be followed at 6 months, 18 months and 30 months, with a symptom inquiry, chest radiograph and sputum for AFB smear and culture.

The risk of progression from infection to disease is highest in the first 2 years after infection.
Algorithm for Tuberculosis Contact Follow-up

**Tuberculosis Contact**
- no record of significant TST, no symptoms

**Tuberculosis Contact**
- previously significant TST or symptomatic

**Tuberculin Skin Test (5TU PPD)**

- Reaction 0-4mm
  - Repeat test in 8-12 weeks
  - Reaction 0-4mm
    - No further follow-up
  - Reaction ≥ 5mm

- Children to age 6 and HIV positive adults

- Reaction ≥ 5mm
  - Referral to TB Control-- include symptom inquiry, chest radiograph, sputum for AFB smear and culture

- TB Diagnosed
  - Treat as active TB
  - Follow-up for INH side-effects
    - Chest radiograph
    - Symptom inquiry
    - Sputum AFB smear and culture
  - Accept

- Not a candidate for preventative therapy
  - Refuse*

*Converters* who refuse preventive therapy are followed with symptom inquiry, chest radiograph and sputum collection at 6, 18 and 30 months post-exposure

1 year after last exposure (unless determined to be a TST converter)
Expanding the Investigation to Medium and Low Risk Casual Contacts

Once the close contacts have been evaluated for tuberculosis infection or disease, the decision must be made whether or not to expand testing to lower risk contacts. Evidence of recent transmission will assist in the determination of the need for expansion. The following factors would indicate recent transmission:

- a secondary case of tuberculosis
- a higher infection rate among contacts than what would be expected in this community
- evidence of transmission to young children
- skin test conversion in contacts

When there is evidence of transmission in the first group of close contacts, the likelihood of further transmission increases, and it is prudent to expand the testing to include those with less contact.

The Concentric Circle Approach to Contact Investigation

The concentric circle approach to contact investigation is a tool used to assist in determining who needs to be screened, and when screening can be considered complete.

Investigation begins with the close contacts of the index case. If none of these individuals have been infected, it is unlikely that those with casual contact need to be screened.

If there is evidence of transmission (as defined previously), those within the next circle are identified and screened. This circle is widened to include the casual contacts of the case. Widening of the circle will continue until there is no further evidence of transmission.

Definition of Contacts

The amount of contact necessary for infection to take place is variable, and dependent on the infectiousness of the case, the environment of exposure, and the duration of exposure. Therefore, the definitions of “close” and “casual” contact may differ from case to case. Tuberculosis Control staff will be of assistance in the determination of risk, but the standard definitions are as follows:

**Close contacts**: (highest risk) are household or “household equivalent” contacts (in the home, at work or in the community) who share the same breathing space on a regular basis.

**Casual contacts**: (medium risk) are those who spend less time with the index case, or whose contact is in a more open environment.

**Casual contacts**: (low risk) are those who spend minimal time with the index case, and are often referred to as “community contacts.”
Evaluation of Contact Investigation Activities

Effective and successful contact investigations can help identify and prevent additional cases of tuberculosis infection and disease, and reduce further transmission of tuberculosis. Because of this, evaluation of activities should be an integral part of completing the investigation, and will assist in determining whether available program resources are adequate and can be used effectively.

Evaluation of activities should be done in conjunction with the Tuberculosis Control Contact Tracing Co-ordinator, or the local TB Clinic, and will be based on the standards set out for contact investigation and prevention.

The following criteria need to be assessed.

► Were an appropriate number of contacts identified?
► Were the highest-priority contacts located and tested?
► Was the contact investigation performed in all settings?
► Was the contact investigation expanded appropriately?
► Were contacts completely evaluated (including follow-up skin test at 8-12 weeks if needed)? Were they recommended appropriate treatment if they had TB infection or disease?
► How many infected contacts completed an adequate regimen of treatment for infection?
► Did all identified cases complete an adequate treatment regimen?
► Did all those who did not complete adequate preventive therapy have a chest radiograph 1 year post contact?

The answers to these questions can help to determine not only how successful the contact investigation has been, but also where additional efforts need to be directed.
At present, there is no truly effective vaccine available for prevention of tuberculosis. While BCG is licensed in Canada, and is used in selected communities, its real benefit lies in preventing the development of severe disease. It is known to have limited effect in primary prevention of tuberculosis (estimated at approximately 50%).

Most prevention efforts are therefore directed at ensuring that, once an individual is infected with tubercle bacilli, the infection does not progress to disease. This is done with the use of preventive drug therapy. Individuals who are infected but do not have active disease cannot spread the disease to others.

**Preventive Drug Therapy**

Preventive drug therapy, or treatment of latent tuberculosis infection (LTBI), is the term used to refer to the use of medications to treat TB after infection has occurred, but before active disease has developed.

The use of single drug preventive therapy is an acceptable practice. This is because TB infection without active disease is the result of a relatively small number of tubercle bacilli. Accordingly the probability of resistant mutants, within an initially susceptible population of bacilli, being selected out by the use of a single drug, is very small.

Some groups of people are more likely to be exposed to, or infected with, *M. tuberculosis* and amongst those infected, some are more likely than others to develop TB disease once infected. People in these groups should receive high priority for preventive therapy if they have a significant TST reaction, and should be referred for assessment. Once active disease has been ruled out they are candidates for preventive therapy (see page 5-5). Decisions about which individuals should be offered preventive therapy are based upon assessment of the following 5 factors.

1. What is the likelihood that the individual has the organism in them? Because significant TST reactions could indicate tuberculous infection, a reaction to previous BCG vaccine or nontuberculous mycobacteria, questions should be asked to try to establish the probability of tuberculous infection. For example:
   - Has this person lived or travelled extensively in a country with high prevalence of tuberculosis?
   - Does this person have a family history of tuberculosis or have known close contact with an infectious individual?
2. What is the likelihood of infection progressing to disease? Medical history can often give indications of the likelihood that an individual’s tuberculous infection will progress to disease. For example:
   - Recent infection (indicated by a TST conversion) has a greater likelihood of progression to disease—5 to 10% of individuals recently infected will go on to develop TB disease within 2 years.
   - An individual who is co-infected with HIV has a much greater chance (10% per year) of developing active disease than someone without HIV infection.
   - Several other medical conditions increase the risk of progression to disease, such as poorly controlled insulin dependent diabetes and end stage renal disease.
   - Drugs such as prednisone suppress an individual’s immune system, leaving the person at higher risk of progression to disease.

3. What is the likelihood of drug intolerance? The probability of drug intolerance can often be predicted based on history. For example:
   - Persons with a history of liver disease or alcohol abuse may have problems tolerating these antituberculous drugs which are potentially hepatotoxic. Other individuals may have developed intolerance to TB medications during previous treatment.
   - Individuals who are taking other medications may have difficulty tolerating TB drugs because of interactions between medications.
   - Older individuals are more likely to develop adverse reactions to TB medications than are younger ones.

4. What is the likelihood that the individual will comply with the preventive therapy recommendations, and complete treatment once begun? For example:
   - Individuals who are transient and are unable to make appropriate arrangements for access to drugs are not likely to complete a course of preventive therapy.
   - Short-stay, foreign-born students are often not in the country long enough to complete a course of preventive therapy.

5. What is the anticipated “fallout” if the individual develops disease?
   - For example, if a day care worker develops disease the public health implications are greater than if someone living as a hermit were to develop disease.

Referrals for evaluation for a course of preventive therapy should be made to TB Control or the local TB Clinic, using the “TB Referral Form,” (see page 6-35.) A thorough history including symptom inquiry should be conducted and reported on the referral form.

In addition, please ensure:
   - that a recent chest radiograph (i.e. within the past 6 months, in the absence of symptoms) is forwarded to the appropriate area. If no recent radiograph is available or the client has symptoms, use the referral form as a requisition for the x-ray, as it ensures the radiograph is forwarded appropriately.
   - submission of sputum for AFB smear and culture if possible (indicate dates sent).

Once active disease has been ruled out, a recommendation will be made regarding further need for investigation, follow-up and/or preventive drug therapy.
## Candidates for Preventive Therapy

The following individuals should be referred to Tuberculosis Control or the local TB Clinic for consideration for preventive therapy.

<table>
<thead>
<tr>
<th>Tuberculin Reaction Size</th>
<th>Indication</th>
</tr>
</thead>
<tbody>
<tr>
<td>≥ 5 mm</td>
<td>• recent close contact with infectious TB</td>
</tr>
<tr>
<td></td>
<td>• HIV infection</td>
</tr>
<tr>
<td></td>
<td>• presence of lung scar (compatible with old TB but not previously treated)</td>
</tr>
<tr>
<td>≥ 10 mm *</td>
<td>• TST converter</td>
</tr>
<tr>
<td></td>
<td>(%previous non-significant TST result within the past 2 years)</td>
</tr>
<tr>
<td></td>
<td>• immunosuppression</td>
</tr>
<tr>
<td></td>
<td>- organ transplantation</td>
</tr>
<tr>
<td></td>
<td>- chronic renal failure</td>
</tr>
<tr>
<td></td>
<td>- prolonged corticosteroid use or other immunosuppressive drug therapy</td>
</tr>
<tr>
<td></td>
<td>- hematologic malignacies--leukemia, lymphoma</td>
</tr>
<tr>
<td></td>
<td>- silicosis</td>
</tr>
<tr>
<td></td>
<td>- diabetes mellitus</td>
</tr>
<tr>
<td></td>
<td>- &lt; 90% of ideal body weight</td>
</tr>
</tbody>
</table>

* Preventative therapy may also be considered in other individuals, particularly if they are under the age of 35, have a TST reaction size ≥ 10 mm and are from one of the following groups: foreign born from TB endemic countries (particularly recent arrivals), Aboriginals, health care workers, and residents in communal care.

In otherwise healthy Canadian-born individuals who are not from an identified risk group and have no known contact with tuberculosis, significant TST results may be due to NTM infection.
Recommendation for Preventive Therapy

If the TB Physician recommends preventive therapy, a copy of the Recommendation for Preventive Therapy form (see page 6-41) will be sent to the family physician for signature. The physician will be directed to forward the signed form to the nearest local public health office for the PHN to co-sign. A copy of this form also will be sent to the regional TB program nurse so that she is aware of the recommendation.

Preventive therapy for latent TB infection is not a mandatory program, and the individual has the right to refuse treatment. The recommendation for prevention therefore also provides information about what the follow-up will be if the client refuses therapy.

The Public Health Nurse should consult with the family physician to discuss who will contact the client to discuss this recommendation.

As with treatment for disease, preventive therapy may be lengthy (6 to 9 months). It is often difficult for clients who feel well to understand the need for such a long course of medication. The client must understand that a commitment to completing a course of preventive therapy is necessary to ensure optimal preventive benefits.

In order to make an informed decision, the client needs to have information regarding:

- the reason for the recommendation
- the benefits of preventive therapy
- possible side-effects of the medication and possible drug interaction
- recommended follow-up if medication is refused

The results of this consultation and discussion will determine whether the client will begin a course of preventive therapy.

If the client agrees to take preventive therapy and the physician concurs:

Before Beginning Treatment

The “Recommendation for Preventive Therapy” form which was sent to the physician must be signed and forwarded to the Public Health Nurse.

Once the Public Health Nurse is confident the client has consented to therapy, the “Recommendation for Preventive Therapy” form should be co-signed and returned to TB Control. As the dose of medication is weight dependent, ensure the client’s weight is recorded on the recommendation form.

Either the nurse or the physician can arrange to have baseline bloodwork performed, according to the medication recommended. This will be detailed on the “TB Update form” (see Appendix 14D) accompanying the recommendation.

If the client is on other medications, check with the pharmacist who fills the prescriptions for those other medications, to ensure drug interactions will not be a concern.
Medication Supply

Drugs for preventive therapy are available through Alberta Health and Wellness TB Control, and they are provided free of charge.

To assist with compliance, directly observed preventive therapy (DOPT) is now the standard in all First Nations communities in Alberta and whenever twice weekly, intermittent, preventive therapy is being administered. It should also be very seriously considered:

- whenever DOT is being administered to an active case in the same home
- in very high risk situations or in communal settings (e.g., converters, HIV positive individuals, correctional facilities)
- when treating persons attending Methadone clinics
- when treating persons with a history of depression or other serious psychiatric illness

A 3 month supply of medications will be sent by mail or courier to the local public health office for distribution to the client. Accompanying the medication will be a detailed summary of the monitoring requirements and potential toxicity/drug interactions.

If the client will be taking daily self-administered preventive therapy, provide a 1 month supply of medication, and retain the rest at the public health office for distribution monthly.

- Attempt to see the client at weekly intervals over the first month to provide an opportunity to assess compliance with medication, provide education regarding the need for continued medication compliance, and monitor for side-effects to the medication.
- If weekly visits are not possible, phone contact can be a substitute for some of these visits.

If the medication will be DOPT, meet with the client to establish a schedule and meeting place to provide the medication.

Monitoring Compliance

Arrange for regular contact (at least monthly in the case of self-administered medication) to monitor compliance and adverse reactions, and to provide more medication as necessary.

To determine compliance, it is important to know both the number of doses that should have been taken since last contact and the actual number of doses taken.

- The most accurate way of doing this is by DOPT.
- For those on daily, unsupervised medications, monthly interviews with the client, and pill counts can assist in this determination.
Complete the preventive therapy form, ensuring medication compliance sections are completed, and forward to Tuberculosis Control every second month. Be sure to indicate whether more drugs are needed, as drugs are not sent out automatically.

On the final compliance report, please provide the date medication was stopped. The following will assist you in determining what constitutes adequate treatment:

- daily for 6 months = 180 doses
- daily for 9 months = 270 doses
- twice weekly for 6 months = 52 doses
- twice weekly for 9 months = 78 doses
- 2 months daily = 60 doses

Brief periods of non-compliance are accepted, but the course of preventive therapy needs to be completed within a specified time period. Such as:

- a 9 month regimen must be completed within 12 months
- a 6 month regimen must be completed within 8 months
- a 4 month regimen must be completed within 6 months
- a 2 month regimen must be completed within 3 months

**Other Monitoring**

Routine monitoring of blood work is age and drug dependent (see Appendix 10), and the TB Update form will detail the recommendations by TB Control for such monitoring as is necessary.

Advise the family physician and TB Control about any adverse reactions to medications.

Notify TB Control promptly if medication is discontinued (even temporarily) because of reactions or if the client moves or is lost to follow-up.

**If the client and/or his physician refuses preventive therapy:**

Some individuals refuse to take preventive therapy, or their physician does not feel that his or her patient will be able to tolerate it because of age or previous ill health. If this is the case, either the physician or the PHN must notify Tuberculosis Control, and a further recommendation for appropriate follow-up will be made.

- Tuberculin Skin Test converters (i.e. those whose TST has converted to a significant reading within the past 2 years) will be followed with symptom inquiry, sputum for AFB smear and culture and radiographs 6 months, 18 months and 30 months following conversion. The highest risk for progression from infection to disease is during the first 2 years following infection.
Preventive Therapy Regimens

Medications used for preventive therapy are the same medications used for treatment of active disease, but protocols for their use differ.

INH is the only drug that has been proven effective in large-scale trials for TB preventive therapy, and is the primary drug that is used in Alberta. However, several alternative regimens are currently being used and/or trialed. Protocols in use at present include:

- INH daily or twice weekly for 9 months (270 or 78 doses respectively)
- Rifampin daily for 4 months (120 doses)
- INH and Rifampin twice weekly for 6 months (52 doses)
- PZA and Rifampin daily for 2 months, given only as DOPT (60 doses)

INH

A 9 month regimen of INH is known to be very effective (over 90% protection), but compliance tends to be a problem for this extended period of time. It has been shown that courses of isoniazid lasting at least 6 months and adhered to provide approximately 65 – 70% protection.

The decision regarding the length of time for treatment is dependent on age and HIV status. The most common prescription will be for 9 months of preventive therapy.

Rifampin

While rifampin has not been studied as extensively as INH for preventive therapy, in theory it should be equally, if not more effective. It is used routinely in individuals who cannot tolerate INH, or who are contacts of an individual with INH-resistant, rifampin-susceptible organisms.

INH and Rifampin

At times, when preventive therapy is directly observed, 6 months of twice-weekly INH and rifampin is used. Exciting data suggests that it is entirely satisfactory.

This regimen is most often used in First Nations community outbreak situations, or in individuals whose radiographs show lung scars, but activity cannot be confirmed.

PZA and Rifampin

Daily PZA and rifampin for 2 months has been demonstrated to be effective in preventing TB in the HIV co-infected. It is currently being introduced, in a controlled manner, into selected populations of HIV-seronegative individuals who have significant TST reactions. This regimen must be given using DOPT.
Bacille Calmette-Guérin (BCG)

In Canada, Bacille Calmette-Guérin (BCG) vaccine is only given to selected populations where there is greater risk of TB infection and disease.

Although it’s effectiveness in preventing pulmonary disease is probably limited, it has been shown to be effective in preventing serious forms of nonrespiratory disease in children. At this time it is still recommended for:

- First Nations Infants living on reserve. It should be given as soon after birth as possible.
  - Unless the vaccine is given before 6 weeks of age, tuberculin skin testing should be done prior to immunization, as there is no value in immunizing a child who already tests positive.
- Certain travellers who will be spending extended periods of time in countries with a high incidence of tuberculosis.

About the Vaccine

BCG is a suspension of a live attenuated strain of *M. bovis*—there have been over 3 billion doses administered worldwide since 1948.

Intradermal injection of vaccine that produces an artificial TB infection triggers an immune response that leads to sensitization of the lymphocytes to tuberculosis, without the risk of disease. The vaccine does not prevent a person from being infected. However, if a person does become infected after being vaccinated, their lymphocytes should recognize the organism quickly and hopefully prevent it from multiplying and causing disease.

Contraindications to Vaccine

- extensive areas of broken or inflamed skin
- family history of genetically transmitted immune disorders or family history of adverse reaction to BCG
- immunocompromised state—for any reason
- infant born to known HIV positive mother
  - As of September 1, 1998, Alberta initiated routine prenatal HIV testing. If the mother is concerned that she is at risk for HIV and was not tested while pregnant, suggest that she have testing before the baby receives BCG.
  - As part of informed consent, parents should be given information regarding the concern about immunizing a child who may be HIV positive. They may still consent to BCG immunization in the absence of HIV testing.
  - First Nations and Inuit Health Branch, Alberta Region has developed a consent form to address this issue.
Reactions to Vaccine Administration

Some reactions to BCG vaccine are to be expected, and are in fact an indication that the vaccine is producing the desired results. Parents must be informed about these expected reactions as well as about the possibility of more severe adverse reactions.

**Mild (Expected Reaction)**

- small reddened pustule in about 2 weeks which will crust over and may weep
- scar at this site in about 6 to 8 weeks

*Note:* keep area covered with gauze or a clean cloth (not a band-aid), and keep arm covered with long sleeves to discourage scratching or bumping.

**Moderate Adverse Reactions (less than 2% of cases)**

- skin ulceration which may spread, lasting up to 3 months
- involvement of lymph glands in the axilla
- abscess formation (this is the most common of the adverse reactions)

*Note:* Cover as with mild reactions, but antituberculosis medications may also be prescribed under the direction of a TB specialist.

**Severe Adverse Reactions (Frequency <1:1,000,000)**

- disseminated BCG disease may occur in infants who are immunocompromised, and is a life threatening condition.

*Note:* requires urgent medical attention
Guidelines for the Prevention and/or Detection of Tuberculosis in Travellers

There is little good information on the risk of tuberculosis in travellers to countries with a high prevalence of TB. We know that the annual risk of infection with *M. tuberculosis* in some high prevalence countries is at least 300-fold higher than in non-aboriginal communities in Alberta.

**Recommendations for Counselling Prior to Travel**

**Assess TB risk as part of the routine pre-travel counselling.** This means risk of exposure and risk of progression to active TB if infected.

- The major determinants of an individual’s risk of significant exposure to tuberculosis infection while travelling are thought to be:
  - prevalence or transmission rates of TB in the destination country. WHO estimates of cases per 100,000 for the year 2000 are: sub-Saharan Africa, 293; Southeast Asia, 247; Western Pacific, 144; Eastern Mediterranean, 168; Eastern Europe, 120.
  - duration of the stay in a high prevalence country
  - nature and frequency of contact with local people in a high prevalence country. This is often difficult to quantify. An example would be an individual working in health care in a high prevalence country. This person should be assumed to carry a very high risk of tuberculosis exposure.

- Travellers who are immunosuppressed due to HIV, cancer therapy, or other factors are at increased risk of progression to active TB if they are infected.

**Inform the client about the possible risk of tuberculosis, based on assessment of the individual and their itinerary.**

- Immunosuppressed travellers should be informed of the serious risk associated with tuberculosis exposure, the fact that a preventive strategy based on skin testing will have major limitations for them and that BCG is likely to be contraindicated.

- Travellers intending to work in a health discipline in a high prevalence country should be informed of the potential high risk of exposure and advised to follow published infection control recommendations for the prevention of TB in health care settings.

Advise all travellers to avoid consumption of unpasteurized milk since it may contain *M. bovis* or other pathogens.
Advise tuberculin skin 2-step testing for travellers to TB endemic countries who anticipate having contact with local residents for any significant amount of time. This is especially important for travellers to high prevalence countries who will be:

- working in a health care setting for any length of time
- travelling or residing in a high prevalence country for more than 3 months
- spending more than 1 month in other circumstances where there is a high risk of exposure

Reactions to TST

- Individuals with significant reactions should be dealt with according to standard guidelines (see page 2-10). Assessment for the presence of active disease should be carried out immediately, but institution of preventive therapy may need to be deferred until after return from travel depending on the individual’s travel schedule.
- Those with no significant reaction should be informed of the following 2 possible strategies for the prevention of tuberculosis.

**Prevention Strategy Options**

**Strategy #1. This is the preferred strategy in most cases.**

Repeat TST yearly while in the high-risk country, and 3 months after leaving the high-risk countries, with consideration of preventive therapy for converters.

Disadvantages:

- It is not unusual to see very poor compliance with follow up testing and with preventive therapy, either because of difficulty in having the TST performed while out of the country, or because of the client’s mistaken perception of risk.
- Standard preventive therapy may be ineffective against drug-resistant strains prevalent in many TB endemic countries.
- Some infected individuals will progress to active disease in the interval between skin tests.
- Some individuals will be intolerant of preventive therapy.

**Note:** Travellers opting for Strategy #1 must be very aware of the importance of follow-up testing. In this group, particular effort should be made to encourage and facilitate compliance with post travel TST.
**Strategy # 2.** This is a less desirable option, but may be warranted in some cases.

**BCG vaccination,** performed at least 4 weeks prior to departure (when possible). BCG vaccine is provided by Alberta Health and Wellness only for selected travellers, and only when approved by a TB physician in the province.

Disadvantages:
- modest and uncertain efficacy
- troublesome ulceration at site of vaccination, particularly when administered to adults
- may complicate interpretation of subsequent TST

**Choosing the Most Appropriate Strategy**

The following factors need to be considered when assisting the client to choose the most appropriate strategy.
- Does the individual qualify for BCG vaccine?
- How feasible is repeated skin testing and how compliant would this client be with preventive therapy?
- What is the likelihood of INH intolerance (age, liver disease, alcohol excess)?
- What is the prevalence of INH or multi-drug resistance in the destination country?
- What is the individual’s preference?
- Age—BCG may have a greater role in young children, reducing the risk of severe disease.

**Recommendation for Follow-up After Return Home**

Since no prevention strategy is completely effective, travellers and health care workers must be aware that tuberculosis should be in the differential diagnosis for any persistent, unexplained illness during or following travel.

**Travellers who chose strategy # 1** (TST and preventive therapy if necessary) should be followed with annual TST while away. They should be re-tested 3 to 6 months after leaving the high-risk countries.
- Those with documented conversion should be offered preventive therapy according to standard guidelines.

**Travellers who chose strategy # 2** (BCG vaccination) should be tuberculin skin tested 3 months post-vaccination to serve as a “baseline” in interpreting any subsequent TST. Individuals who do not convert their skin test should be re-tested as for those who have chosen strategy # 1.
- Those whose skin test is read as significant following vaccination should be counselled to report any symptoms of tuberculosis to their physician.
1. Drug Considerations for Special Situations
2. Public Health Act and CD Regulations as They Relate to Tuberculosis
3. Sputum Collection
   3.A. Sputum Induction
   3.B. Sputum Induction Using Aerosolization
   3.C. Sputum Collection Using Gastric Aspiration
4. Doses of and Common Adverse Reactions to Second-line Antituberculous Drugs
5. INH Preventive Therapy Fact sheet
6. Rifampin Preventive Therapy Fact Sheet
7. Pyrazinamide Preventive Therapy Fact Sheet
8. Monitoring While on Active Treatment
9. Tuberculosis Treatment Letter for Patients
10. Monitoring Worksheet for Preventive Therapy
11. Preventive Therapy Letter to Patient
12. TB Program Within Alberta Health and Wellness
13. Important Contact Names and Phone Numbers
14. Forms.
   14.A. Directly Observed Therapy Record
   14.B. Treatment Record and Follow-up
   14.C. TB Referral Form
   14.D. TB Update Form
   14.E. Recommendation for Preventive Therapy
   14.F. Preventive Therapy
   14.G. Contact List/Master List
15. Interview Checklist
16. Resources
   16.A. Print Resources Available in the Warehouse
17. Respiratory Isolation Guidelines
18. Screening and Prevention of Tuberculosis in HIV Patients
Appendix 1: Drug Considerations for Special Situations

Pregnancy

Rifampin
Isoniazid
Ethambutol

have all been approved for use in pregnancy and may be continued during breast feeding.

Pyrazinamide has not been approved for use during pregnancy, not because of any demonstrated adverse effect, but for lack of information.

Streptomycin affects the fetal eighth cranial nerve and is thus contraindicated during pregnancy.

Renal Failure

Rifampin and Isoniazid do not depend on the kidneys for elimination from the body and may thus be used in standard doses in patients with renal failure.

► Patients with renal failure seem to be particularly prone to the development of peripheral neuropathy while taking Isoniazid. It is therefore recommended that vitamin B6 be given at a dose of 50mg per day in conjunction with Isoniazid in such patients.

Pyrazinamide excretion is delayed in renal failure and the drug does cause serum urate levels to rise.

► Nevertheless, pyrazinamide may be used in renal failure although the dose is usually decreased and/or the interval between doses increased. For example, in severe renal failure, the frequency of the dose could be decreased from daily to 3 times per week, and the dose itself decreased to 40 mg/kg (i.e. 2-2.5 gm thrice weekly).

► The drug is cleared by dialysis and should be given 24 hours before dialysis.

Ethambutol depends entirely on the kidneys for clearance and blood levels of the drug are difficult to obtain.

► Because it may cause irreversible blindness, Ethambutol should be avoided when renal function is impaired.

Streptomycin may be used in renal failure at a dose of 750 mg twice per week.

► It should be given at least 6 hours before dialysis.

Renal or Other Transplant

In patients who have had renal or other transplants, tuberculosis treatment has a significant interaction with drugs such as corticosteroids and cyclosporin used to protect the patient from organ rejection.

Careful collaboration with the transplant team is essential.
HIV Infected Patients

Treatment regimens for tuberculosis in those co-infected with HIV may not need to be modified although it is still current practice to continue treatment for drug susceptible isolates for 9 months, and at least 6 months after the culture becomes negative.

Because there may be an increased prevalence of resistant *M. tuberculosis* in subjects with HIV infection, initial treatment must include 4 drugs (rifampin, isoniazid, pyrazinamide and ethambutol).

It is important to recognize the significant risk of interaction between the anti-tuberculosis drugs and the antiretrovirals used to treat patients with HIV disease.

Children

Tuberculosis regimens for children need to have doses adjusted in accordance with the child’s weight.

Ethambutol is usually not recommended in children who are unable to cooperate in testing of colour vision or of visual acuity. Ethambutol may, however, be used at a dose of 15mg/kg when treating disease caused by known or suspected drug resistant *Mycobacterium tuberculosis*. 
Appendix 2: Public Health Act and CD Regulations for Tuberculosis

The direction of the Tuberculosis Control Program in Alberta is structured in accordance with the Alberta Public Health Act* and Communicable Disease Regulation*, under which the Act is translated. Key aspects of the Public Health Act and CD Regulation, are summarized here.

Public Health Act: (Part 4)

- Sections 31 to 48 of the Public Health Act describe the duty of health care workers to report known or suspected communicable diseases to the Medical Officer of Health, who in turn will notify the Provincial Health Officer and ensure appropriate investigations are begun.

- Sections 49 to 62 deal with management of Recalcitrant Patients.

Communicable Disease Regulation (specifically as they relate to the TB Program)

- Schedule 1 describes Tuberculosis as one of the prescribed notifiable diseases.

- Section 3 (1): The Minister may provide free of charge drugs for the treatment or modification of communicable diseases.

- Section 4: In any dispute as to the diagnosis of a disease in respect of which action may be taken under section 39 (1) of the Act, the medical officer of health’s decision as to the diagnosis of the disease is final, subject only to a review by the Director.

- Section 5: When a person is infected with a communicable disease in respect of which the Act requires that notification be given to a medical officer of health, the notification shall be given to the medical officer of health of the health unit in which the person was located at the time of the onset of symptoms.

- Section 7: A medical officer of health may, in exercising his powers and carrying out his duties under the Act and this Regulation, use the assistance of the community health nurses and inspectors.

- Section 8 (1): A medical officer of health shall, in accordance with Schedule 4, investigate all occurrences of notifiable disease to establish the cause, the mode of transmission and the probable source and to identify others who may be at risk.

  (2): In addition to the specific provisions to Schedule 4, a medical officer of health shall take whatever steps are reasonably possible

  i) to suppress disease in those who may already have been infected with a communicable disease

  ii) to protect those who have not already been exposed

  iii) to break the chain of transmission and prevent spread of the disease

  iv) to remove the source of infection
• Schedule 3 designates tuberculosis as one of the diseases for which warrants for recalcitrant patients may be issued.

• Schedule 4, as it relates to tuberculosis indicates that:
  1. Individual occurrences are reportable by all sources to the medical officer of health within 48 hours
  2. The medical officer of health shall conduct an investigation of the source of the infection and all the contacts in accordance with the directions of the Director of Tuberculosis Services in the Department.
  3. (1) In the case of Pulmonary Tuberculosis in an infectious form, modified (respiratory) isolation procedures apply until the person is no longer infectious.
      (2) Modified (secretion or contact) isolation procedures apply to a person with cutaneous tuberculosis lesions or discharging sinuses until the lesions or sinuses are shown to be bacteriologically sterile.
  5. (1) The medical officer of health shall order that all familial contacts and all other contacts he considers to have been sufficiently exposed are tuberculin tested.
      (2) Where a person who is tested pursuant to subsection (1) has a positive reaction
          (a) the medical officer of health shall order a chest x-ray and any other diagnostic procedures he considers appropriate, and
          (b) the person is subject to surveillance until the medical officer of health is satisfied that the risk of infection has passed.
  6. The medical officer of health shall by order exclude a person with cutaneous tuberculosis in an infectious form from public places and from employment in occupations involving the care of children, close contact with the public or the handling of food until the person is no longer infectious.

*Copies of these publications can be obtained from the Queen’s Printer.
Appendix 3: Sputum Collection

Sputum should always be collected by the least obtrusive means possible. If the client is unable to produce sputum spontaneously, assistance will be necessary. The following procedures are set out in order of least obtrusive to most obtrusive.

Note: To protect the health care worker and others, sputum specimens from a client with suspected active tuberculosis should always be collected in a separate room with air vented to the outside or in the open air. While collecting a sputum specimen, the health worker should wear a mask capable of filtering 95% or more of the particles less than 1 micron in size. If this is not possible, serious consideration should be given to obtaining the specimens at a centre with the necessary facilities.

3A Sputum Induction (without aerosolization)

**Equipment**
- sterile specimen containers (well labelled) with secure lids
- completed laboratory requisitions indicating sputum is to be tested for AFB
- transport containers with sealable plastic (biohazard) bags
- facial tissues
- separate room vented to the outside
- well-fitting mask for specimen collector

<table>
<thead>
<tr>
<th>Assessment Steps</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Assess level of hydration.</td>
<td>Dry mouth and dehydration can inhibit deep coughing and sputum production. Provide increased fluids the day before specimen collection.</td>
</tr>
<tr>
<td>2. Assess client’s ability to cough and expectorate.</td>
<td>Pain, weakness, inadequate coughing technique and fear of stress incontinence can inhibit coughing and sputum production.</td>
</tr>
<tr>
<td>3. Determine client’s need for assistance to cough.</td>
<td>Positioning, postural drainage, chest vibration, support to rib cage and/or inhalation of warm mist may improve ability to cough productively. Sitting on an incontinence pad or toilet may relieve fear of incontinence.</td>
</tr>
<tr>
<td>4. Assess client’s respiratory status (rate, depth, pattern, skin colour).</td>
<td>Active coughing can cause bronchospasm.</td>
</tr>
<tr>
<td>Procedure Steps</td>
<td>Rationale</td>
</tr>
<tr>
<td>---------------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>1. Plan to collect specimen in the early morning before breakfast, if possible.</td>
<td>Bacteria are concentrated in bronchial secretions that have accumulated overnight. Sputum collected prior to breakfast is less likely to be contaminated with food.</td>
</tr>
<tr>
<td>2. Provide privacy.</td>
<td>Procedure may be embarrassing to client and offensive to others.</td>
</tr>
<tr>
<td>4. Describe procedure and explain reason for test.</td>
<td>Understanding reduces anxiety and promotes co-operation and the production of a quality specimen.</td>
</tr>
<tr>
<td>5. Open sputum container, keep lid and give only the bottom to client, asking client not to touch inside of container.</td>
<td>Minimizes transmission and contamination of specimen container.</td>
</tr>
<tr>
<td>6. Instruct client to inhale and exhale deeply 3 times, then inhale quickly, cough forcefully, and expirate into sputum container. Demonstrate.</td>
<td>Promotes deep coughing.</td>
</tr>
<tr>
<td>7. Check quality and quantity of the sputum. If amount is insufficient, encourage client to repeat procedure.</td>
<td>A specimen of 3 - 5 ml containing solid or purulent material is desirable. Production of a quality specimen may take a few efforts and up to 15 minutes.</td>
</tr>
<tr>
<td>8. Close labelled sputum container securely, wrap in absorbent material, and place into a zip-lock plastic (biohazard) bag. Place the bag into a designated transport container.</td>
<td>Minimizes spillage and exposure of health workers during transport.</td>
</tr>
<tr>
<td>9. Enclose appropriately labelled requisition in sleeve of bag designed for this purpose (sputum, mycobacteria AFB).</td>
<td>Assures identification and proper testing of specimen.</td>
</tr>
<tr>
<td>10. Forward specimen to the laboratory as soon as possible.</td>
<td>Prompt delivery reduces opportunity for normal organisms to contaminate specimen.</td>
</tr>
<tr>
<td>11. Consult Tuberculosis Control or the practitioner who requested the specimen if collection of sputum is unsuccessful.</td>
<td>Referral for aerosolization, gastric washing or a bronchoscopy may be required.</td>
</tr>
</tbody>
</table>
3B  Sputum Induction Using Aerosolization

This procedure may require the assistance of a respiratory therapist.

Equipment
- sterile specimen containers with secure lids
- client specific identification labels
- completed laboratory requisitions indicating sputum is to be tested for mycobacteria AFB and was collected using aerosolization
- transport containers with sealable plastic (biohazard) bags
- facial tissues
- emesis basin (for gagging or accidental vomiting)
- high volume nebulizer/aerosol set-up with cold neb tubing and mask
- compressed air source with flowmeter and fitting for attachment to the nebulizer set-up
- NaCl solution (hypertonic saline), made up by pharmacist: reliable studies recommend 6 ml/min of 3% hypertonic saline using an ultrasonic nebulizer
- bronchodilator inhalant in case of bronchospasm
- separate room vented to the outside
- well-fitting mask for specimen collector

<table>
<thead>
<tr>
<th>Assessment Steps</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Assess client’s ability to cough and expectorate.</td>
<td>Pain, weakness, inadequate coughing technique and fear of stress incontinence can inhibit coughing and sputum production.</td>
</tr>
<tr>
<td>2. Determine client’s need for assistance to cough.</td>
<td>Positioning, postural drainage, chest vibration, support to rib cage. Sitting on an incontinence pad may relieve fear of incontinence.</td>
</tr>
<tr>
<td>3. Assess client’s respiratory status (rate, depth, pattern, skin colour).</td>
<td>Inhaling hypertonic saline can cause irritation leading to bronchospasm. Inhaling bronchodilator will relieve bronchospasm.</td>
</tr>
<tr>
<td>Procedure Steps</td>
<td>Rationale</td>
</tr>
<tr>
<td>-------------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------</td>
</tr>
<tr>
<td>1. Prepare to collect specimen in a separate well-ventilated room.</td>
<td>Minimizes spread of infectious organisms to health care provider and others.</td>
</tr>
<tr>
<td>2. Plan to collect specimen in the early morning before breakfast, if possible.</td>
<td>Bacteria are concentrated in bronchial secretions which have accumulated overnight. Sputum collected prior to breakfast is less likely to be contaminated with food.</td>
</tr>
<tr>
<td>3. Provide privacy.</td>
<td>Procedure may be embarrassing to client and offensive to others.</td>
</tr>
<tr>
<td>4. Assist client to sit in an upright position.</td>
<td>Promotes proper coughing technique.</td>
</tr>
<tr>
<td>5. Describe procedure and explain that mist from mask will aid sputum production. Mucus must come up from as deep in the lungs as possible. Spit or saliva is not acceptable.</td>
<td>Understanding reduces anxiety and promotes co-operation and the production of a quality specimen.</td>
</tr>
<tr>
<td>6. Fill nebulizer with 3% hypertonic saline.</td>
<td>Hypertonic saline will cause airway irritation that will induce sputum production and coughing.</td>
</tr>
<tr>
<td>7. Attach aerosol mask and nebulizer to air delivery system according to manufacturer’s instructions. Set flowmeter to 6 ml/min.</td>
<td>To produce optimum aerosol flow.</td>
</tr>
<tr>
<td>8. Open the sputum container, keep the lid and give only the bottom to the client, asking the client not to touch the inside of the container.</td>
<td>Minimizes transmission and contamination of specimen container.</td>
</tr>
<tr>
<td>10. Instruct the client to hold the aerosol mask while breathing the mist for 15 minutes (this will take approximately 70-90 ml of solution). Then have them cough forcefully and expectorate into the sputum container.</td>
<td>Promotes deep coughing.</td>
</tr>
<tr>
<td>11. Check quality and quantity of the sputum. If amount insufficient, encourage client to repeat procedure.</td>
<td>A specimen of approximately 5 ml containing solid or purulent material is sufficient. When aerosolization is used, specimen may appear watery. May take a few efforts to produce quality specimen.</td>
</tr>
<tr>
<td>12. Close the labelled sputum container securely, wrap in absorbent material and place in a zip-lock plastic (biohazard) bag. Place the bag into a designated transport container.</td>
<td>Minimizes spillage and exposure for health workers during transport.</td>
</tr>
<tr>
<td>13. Enclose the appropriately labelled requisition. Indicate that aerosolization used.</td>
<td>Assures identification and proper testing of specimen that may appear to be saliva.</td>
</tr>
<tr>
<td>14. Send specimen to the laboratory as soon as possible.</td>
<td>Prompt delivery reduces opportunity for normal organisms to contaminate specimen.</td>
</tr>
<tr>
<td>15. Dispose of aerosol mask, hypertonic saline and empty containers used unsuccessfully to collect sputum in agency designated container.</td>
<td>Prevents spread of infectious organisms and contamination of a future specimen.</td>
</tr>
<tr>
<td>16. Remove your mask and wash hands (yours and theirs) with soap and water.</td>
<td>Washing hands minimizes spread of infectious organisms.</td>
</tr>
<tr>
<td>17. If using ultraviolet light for disinfection, leave on for 1 hour.</td>
<td>Allows for proper disinfection of collection area.</td>
</tr>
<tr>
<td>18. Consult Tuberculosis Control or the practitioner who requested the specimen if collection of sputum is unsuccessful.</td>
<td>Gastric washing or a bronchoscope may be required.</td>
</tr>
</tbody>
</table>
This is an uncomfortable procedure used only for collecting specimens from children and the elderly who cannot produce sputum by expectoration or nebulization.

**Equipment**
- sterile specimen containers with secure lids containing phosphate buffer to neutralize gastric acid (available from Provincial Laboratory of Public Health)
- client specific identification labels
- completed laboratory requisitions indicating gastric wash specimens are to be tested for mycobacteria (AFB)
- transport containers with sealable plastic (biohazard) bags
- nasogastric tubing (size 8F for children, 10-12F for adults)
- water based lubricant
- 50 - 60 ml catheter tip syringe for aspiration
- 30 ml sterile distilled water or normal saline if necessary
- emesis basin (for gagging or accidental vomiting)
- stethoscope
- clamp
- well-fitting mask for specimen collector

<table>
<thead>
<tr>
<th>Assessment Steps</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Assess client’s ability to understand procedure.</td>
<td>Allows nurse to tailor teaching plan to client’s level of understanding.</td>
</tr>
<tr>
<td>2. Determine recent history of antimicrobial therapy.</td>
<td>Antimicrobial drugs can weaken bacilli and cause false negative results. Procedure should be performed prior to antimicrobial therapy.</td>
</tr>
<tr>
<td>Procedure Steps</td>
<td>Rationale</td>
</tr>
<tr>
<td>-------------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>1. Plan to collect specimen in the early morning before breakfast, if possible. For very young children the procedure should be performed immediately after awakening.</td>
<td>Food may cause digestion, thereby removing stomach contents and decreasing the amount of sputum and number of bacteria available for collection.</td>
</tr>
<tr>
<td>2. Provide privacy.</td>
<td>Procedure may be embarrassing to client.</td>
</tr>
<tr>
<td>3. Describe procedure and explain that the nasogastric tube may cause gagging but that relaxing and following instructions will ease the process.</td>
<td>Understanding reduces anxiety and promotes co-operation.</td>
</tr>
<tr>
<td>4. Obtain baseline heart rate and rhythm.</td>
<td>Some individuals develop arrhythmias during this procedure.</td>
</tr>
<tr>
<td>5. Fit your mask snugly.</td>
<td>Minimizes health worker’s inhalation of airborne droplets.</td>
</tr>
<tr>
<td>6. Assist client to assume high Fowler’s position.</td>
<td>Decreases potential for aspiration and promotes entry of tube into stomach.</td>
</tr>
<tr>
<td>7. Follow your agency procedure for insertion of nasogastric or orogastric tube and note contraindications.</td>
<td>Assures proper insertion.</td>
</tr>
<tr>
<td>8. Aspirate more than 2 ml of stomach contents with syringe.</td>
<td>If no aspirate is obtained, instil 30 ml of sterile distilled water or normal saline and re-aspirate.</td>
</tr>
<tr>
<td>9. Empty contents of syringe into specimen bottle containing phosphate buffer.</td>
<td>Gastric acid can inhibit the growth of tubercle bacilli.</td>
</tr>
<tr>
<td>10. Close specimen container securely, apply label, wrap in absorbent material and place container into a sealable plastic (biohazard) bag in a designated transport container.</td>
<td>Minimizes spillage and exposure for health workers during transport.</td>
</tr>
<tr>
<td>11. Enclose the appropriately labelled requisition (gastric washing, mycobacteria AFB). Note recent antimicrobial therapy.</td>
<td>Assures identification and proper testing of specimen.</td>
</tr>
<tr>
<td>12. Clamp and remove tube and offer appropriate comfort measures.</td>
<td>Procedure is uncomfortable.</td>
</tr>
<tr>
<td>13. Refrigerate specimen and send to the laboratory as soon as possible.</td>
<td>Prompt delivery reduces opportunity for normal organisms to contaminate specimen.</td>
</tr>
<tr>
<td>14. Remove mask and wash hands according to your agency policy.</td>
<td>Minimizes spread of infectious organisms.</td>
</tr>
</tbody>
</table>
## Appendix 4: Second-Line Antituberculous Drugs—Doses and Common Adverse Reactions

<table>
<thead>
<tr>
<th>Drug†</th>
<th>Usual Adult Daily Dosage‡</th>
<th>Peak Serum Concentration</th>
<th>Recommended Regular Monitoring</th>
<th>Adverse Reactions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amikacin</td>
<td>15 mg/kg</td>
<td>35-45 μg/ml</td>
<td>Vestibular function, audiometry, blood urea nitrogen, creatinine, electrolytes</td>
<td>Auditory, vestibular and renal toxicity. If possible, avoid in pregnancy.</td>
</tr>
<tr>
<td>Kanamycin</td>
<td>15 mg/kg</td>
<td>35-45 μg/ml</td>
<td>Vestibular function, audiometry, blood urea nitrogen, creatinine, electrolytes</td>
<td>Auditory, vestibular and renal toxicity. If possible, avoid in pregnancy.</td>
</tr>
<tr>
<td>Capreomycin</td>
<td>15 mg/kg</td>
<td>35-45 μg/ml</td>
<td>Vestibular function, audiometry, blood urea nitrogen, creatinine, electrolytes</td>
<td>Auditory, vestibular and renal toxicity. Avoid in pregnancy.</td>
</tr>
<tr>
<td>Ethionamide</td>
<td>250 mg BID or TID</td>
<td>1-5 μg/ml</td>
<td>Hepatic enzymes, glucose</td>
<td>GI disturbance, hepatotoxicity, psychotic reactions, hypoglycemia. Avoid in pregnancy.</td>
</tr>
<tr>
<td>Para-Amino salicylic Acid</td>
<td>4 gm BID or TID</td>
<td>20-40 μg/ml</td>
<td>Hepatic enzymes, electrolytes, thyroid function</td>
<td>GI disturbance, hepatic dysfunction, hypokalemia. Avoid in renal failure.</td>
</tr>
<tr>
<td>Cycloserine</td>
<td>250 mg BID or TID</td>
<td>20-35 μg/ml</td>
<td>Mental status</td>
<td>Avoid in patients with epilepsy, mental illness or alcoholism.</td>
</tr>
<tr>
<td>Ofloxacin Ciprofloxacin Sparfloxacin Levofloxacin</td>
<td>400 mg BID 750 mg BID 200 mg BID 500-750 mg OD</td>
<td>8-10 μg/ml 3-5 μg/ml</td>
<td>Hepatic enzymes</td>
<td>GI disturbance, headache, anxiety, tremulousness. Avoid in pregnant women or growing children.</td>
</tr>
<tr>
<td>Rifabutin</td>
<td>350-450 mg</td>
<td></td>
<td>Hepatic enzymes, complete blood count</td>
<td>Hepatotoxicity, uveitis thrombocytopenia, neutropenia.</td>
</tr>
<tr>
<td>Clofazimine</td>
<td>100-300 mg OD</td>
<td></td>
<td>Macular pigmentary changes</td>
<td>Skin discolouration, ichthyosis, anorexia, nausea, vomiting, abdominal pain, peripheral neuropathy, rare ocular changes.</td>
</tr>
</tbody>
</table>

† Second line drugs are more difficult to manage than first-line drugs. They should be administered and monitored by health care providers experienced in their use.

‡ OD—once daily, BID—twice a day, TID—3 times a day
Isoniazid (INH) Preventive Therapy Fact Sheet

Isoniazid preventive therapy is ideally administered over a period of 9 months (270 doses of 5 mg/kg self-administered over 9 to 12 months; 78 doses of 15 mg/kg twice weekly directly observed over 9-12 months). Although somewhat arbitrary and subject to change, the following are the minimum recommendations for monitoring during INH preventive therapy. * Similar recommendations are made in the Canadian Tuberculosis Standards.

1. Baseline liver function testing (AST or ALT level) is recommended before INH preventive therapy in those over age 35 years and under ideal circumstances, in all age groups.

2. Monitoring, on a monthly basis, for symptoms of hepatotoxicity (nausea, vomiting, abdominal discomfort, anorexia, tea coloured urine, yellow pigmentation, rash, persistent fever, fatigue that is temporally related to the introduction of INH) is recommended for the duration of preventive therapy in all age groups. This is carried out by the Public Health Nurse. Recipients of INH should also be warned of these symptoms and asked to bring them to the attention of the Public Health Nurse or family physician if they should develop between scheduled visits.

3. For those 20 years and younger, in the absence of symptoms, no liver function testing is required after introduction of preventive therapy.

4. For those greater than 20 and less than 35 years, it is recommended that AST (ALT) be measured after one (1), two (2) and three (3) months of preventive therapy, and as necessary thereafter.

5. For those greater than 35 years, it is recommended that AST (ALT) be measured after one (1), two (2), three (3), six (6) and nine (9) months of preventive therapy.

* Special consideration needs to be given to those individuals who have co-existing conditions that increase the risk of hepatotoxicity or those taking medications known to interact with INH.

Because of concerns about use of any medication during pregnancy and of limited data suggesting an increased frequency of hepatotoxicity during pregnancy and the postpartum period, preventive therapy is usually deferred until after delivery. However, in tuberculin reactors who are HIV seropositive or who are contacts of infectious tuberculosis patients, and in those with recent skin test conversions, preventive therapy is begun after the first trimester.

If baseline AST (ALT) is increased above the upper limit of normal, then the case should be discussed with the Edmonton or Calgary TB Clinic or Alberta Health and Wellness TB Control or before proceeding.

Although there are no fixed rules regarding when to discontinue INH on account of hepatotoxicity, generally speaking, if symptoms are thought to be due to INH toxicity, the drug should be stopped and if the aminotransferase levels exceed three (3) to five (5) times the upper limit of normal, consideration needs to be given to stopping the drug. Higher levels are occasionally acceptable and continuation or re-introduction of INH may be possible but these decisions should be made collaboratively with the TB Clinics or TB Control.
Appendix 6

Rifampin Preventive Therapy Fact Sheet

When rifampin is used for purposes of preventing tuberculosis it is used in one of three regimens:
   a) monotherapy; 10 mg/kg daily, unsupervised, to a total of 120 doses over 4 – 6 months.
   b) combined with isoniazid; twice weekly, directly observed isoniazid (15 mg/kg), rifampin
      (10 mg/kg) and pyridoxine 50 mg to a total of 52 doses over 6 months.
   c) combined with pyrazinamide; daily, directly observed, rifampin (10 mg/kg) and pyrazinamide
      (20 mg/kg) to a total of 60 doses over 90 days.

Although somewhat arbitrary and subject to change, the following are the minimum recommendations for
monitoring during rifampin preventive therapy. The recommendations only apply to regimens a) and b) above.
For recommendations regarding regimen c) above, the reader is referred to the pyrazinamide fact sheet.
Similar recommendations are made in the Canadian Tuberculosis Standards.

1. Baseline liver function testing (AST or ALT) and a complete blood count (CBC), white blood
   count (WCB) and platelet count are recommended before rifampin preventive therapy in all age
   groups.

2. For those receiving a 4 month or 6 month rifampin containing preventive therapy regimen,
   monitor on a monthly basis for symptoms of hepatotoxicity (nausea, vomiting, abdominal discomfort,
   anorexia, tea coloured urine, yellow pigmentation, rash, persistent fever, fatigue temporally related to the
   introduction of rifampin and unexplained by other mechanisms). This monitoring is carried out by the
   Public Health Nurse. Recipients of rifampin should be warned of these symptoms and asked to bring them to
   the attention of the public health nurse or family physician should they develop between scheduled visits.

   It should be noted that the dark urine of hepatitis is to be distinguished from the orange discoloration of
   urine, saliva and tears that may occur on rifampin treatment. The latter is of little consequence except for
   those wearing soft contact lenses who should be advised that rifampin may lead to permanent discoloration
   of the lenses from pigmented tears.

3. For those 20 years of age and younger, no liver function testing is required after introduction of
   preventive therapy in the absence of symptoms.

4. For those greater than 20 years of age and less than 35 years, it is recommended that the AST
   (ALT) and CBC, WBC and platelet count be measured after one (1), two (2), and three (3) months of
   preventive therapy, and as necessary thereafter.

5. For those greater than 35 years, it is recommended that the AST (ALT) and CBC, WBC and platelet
   count be measured after one (1), two (2), three (3), four (4), and (if on a 6 month regimen) six (6) months
   of preventive therapy.

It must be appreciated that there is relatively less experience with rifampin as preventive therapy
than is the case with isoniazid. Outlined below are special considerations.
a) Rifampin may interact with a number of other drugs the patient is already taking or planning to receive. Some of the more significant drug-drug interactions are:

- Rifampin induces liver microsomal enzymes, resulting in more rapid elimination of the following compounds:
  - protease inhibitors
  - azole antifungal agents
  - corticosteroids (exogenous and endogenous)
  - warfarin anticoagulants
  - opiates, including methadone
  - oral hypoglycemic agents
  - macrolides
  - anticonvulsants
  - antiarrhythmics, beta blockers and calcium channel blockers
  - benzodiazepines
  - cyclosporin
  - oral contraceptives

- The following compounds inhibit the liver microsomal enzymes resulting in retarded elimination of rifampin:
  - protease inhibitors
  - azole antifungal agents
  - clarythromycin

b) Although rifampin is not known to be toxic to the fetus, because of concern about the use of any medication during pregnancy, preventive therapy is usually deferred until after delivery. However, in tuberculin reactors who are HIV seropositive or who are contacts of infectious tuberculosis patients, and in those with recent skin test conversions, preventive therapy is begun immediately.

c) Closer monitoring of patients whose initial evaluation suggests a liver disorder (e.g. hepatitis B or C, alcoholic hepatitis, or cirrhosis, and other persons who use alcohol regularly or are otherwise at risk for chronic liver disease) may be needed.

d) If baseline AST (ALT) is increased above the normal or baseline cell counts are decreased below normal, then the case should be discussed with the Capital Health TB Clinic or the Calgary Region TB Clinic, or Alberta Health and Wellness TB Control before proceeding.

e) Although there are no fixed rules regarding when to discontinue rifampin on account of hepatotoxicity, generally speaking, if symptoms are thought to be due to rifampin toxicity the drug should be stopped and if the aminotransferase levels exceed three (3) to five (5) times the upper limit of normal, consideration needs to be given to stopping the drug. Higher levels are occasionally acceptable and continuation or reintroduction of rifampin may be possible but these decisions should be made collaboratively with the clinics or TB Control.

f) When rifampin is administered with isoniazid or pyrazinamide there is a slightly increased incidence of hepatotoxicity than with either drug alone.

g) Rarely rifampin may be associated with adverse effects other than hepatotoxicity or abnormalities in the peripheral blood cell counts. These include fever, rash, memory impairment, renal toxicity and altered immune responses. A very rare hypotensive reaction similar to anaphylactic shock has also been described.
Appendix 7

Pyrazinamide Preventive Therapy Fact Sheet

When pyrazinamide is used for preventing tuberculosis it is always used with another drug; usually with rifampin but on occasion with ethambutol or a quinolone. When combined with rifampin it is administered daily and directly observed; doses are pyrazinamide 20 mg/kg and rifampin 10 mg/kg to a total of 60 doses of each drug over 60 – 90 days.

Although somewhat arbitrary and subject to change, the following are the minimum recommendations for monitoring during pyrazinamide preventive therapy. Similar recommendations are made in the Canadian Tuberculosis Standards.

1. **Pyrazinamide may be hepatotoxic. It may increase the risk of hepatotoxicity associated with rifampin alone. Monitoring of rifampin is as outlined on the rifampin fact sheet.**

2. A preventive therapy regimen of rifampin and pyrazinamide is not recommended in those with underlying liver disease. Ideally, knowledge of the patient’s HCV and HBV serologic status, prior to the introduction of the regimen should be established.

3. Pyrazinamide can cause elevation of serum uric acid levels by inhibition of renal tubular secretion of uric acid. Although hyperuricemia can occur in up to 64% of recipients, arthralgias only occur in 11% and acute gout is rare. Routine monitoring of uric acid levels is not recommended. In addition to close monitoring for symptoms of hepatotoxicity, patients receiving the 2-month, 60 dose rifampin-pyrazinamide regimen should undergo regular blood work (cell counts and aminotransferase levels) at baseline, 2 weeks, 4 weeks, 6 weeks, 8 weeks, and possibly 10 weeks depending upon the duration of the regimen.

4. **Pyrazinamide is not recommended during pregnancy**, as there is inadequate data on the teratogenicity of the drug.
### Nurse’s Worksheet - Monitoring of Patients with Active TB Disease

**TX: DOT HRZ = 2m ± EMB, HR = 4m**

<table>
<thead>
<tr>
<th>Active TX AST</th>
<th>B*</th>
<th>Respiratory Smear Positive</th>
<th>Respiratory Smear negative</th>
<th>Non-respiratory</th>
</tr>
</thead>
</table>
|               | ✓  | • 2 weeks after start of treatment  
• then monthly | • then monthly  
• 2 weeks after start of treatment | • 2 weeks after start of treatment  
• then monthly |
| CBC, WBC, platelets | ✓ | • 2 weeks after start of treatment  
• then monthly | • then monthly  
• then monthly | • 2 weeks after start of treatment  
• then monthly |
| Sputum | ✓ | • 2-3 times weekly for 1 month  
• if smear positive, repeat until 3 consecutive negative smears on separate days  
• then monthly x 3  
• at completion of treatment  
• at 6 & 12 m post-treatment | • monthly x 3 months  
• at completion of treatment  
• at 6 & 12 m post-treatment | • at completion of treatment |
| CXR | ✓ | • after 1 and 2 months of treatment  
• at completion of treatment  
• at 6 & 12 m post-treatment | • after 1 & 2 months of treatment  
• at completion of treatment;  
• at 6 & 12 m post-treatment | • at completion of treatment |
| Visual Acuity | | • Monthly EMB only | • Monthly EMB only | • Monthly EMB only |
| Symptoms | ✓ | • Monthly  
• 6 & 12 months post-treatment | • Monthly  
• 6 & 12 months post-treatment | • Monthly  
• 6 & 12 months post-treatment |
| Bilirubin | ✓ | | | |
| Creatinine | ✓ | | | |
| Urea | ✓ | | | |
| Glucose | ✓ | | | |
| HIV | ✓ | | | |
| Urinalysis | ✓ | | | |

*B = baseline
Appendix 9: Tuberculosis Treatment Letter for Patients

Date: 
Name: 
Address: 

Phone No: 
DOB: 
Family Doctor: 

We are pleased that arrangements have been made for your tuberculosis treatment. Your family doctor has been notified of the anti-tuberculosis medication you are receiving.

Today, with modern medicine, tuberculosis can be cured in almost all instances provided, of course, you take your medication as ordered. TB medicines are safe, but once in a while they can cause side effects. If you notice any changes in your health or appearance while taking the medicine, tell your doctor or nurse. Most people don’t have problems taking TB medicines.

Some changes that you should watch out for are:
- yellowish discoloration of skin
- dark tea-colored urine
- vomiting
- loss of appetite
- nausea
- changes in eyesight
- unexplained fever
- unexplained fatigue
- stomach cramps

You should:
- take your pills with milk, water, juice, soda or tea
- tell your doctor or nurse about any other medications you are taking
- tell your doctor or nurse if you are taking birth control pills
- **AVOID** excessive use of alcoholic beverages while being treated for TB
- make sure you eat healthy foods and get enough rest
- If you are taking rifampin, don’t worry if your urine, saliva or tears turn orange. This is a normal side effect. You should avoid the use of soft contact lenses while using rifampin as this drug may cause them permanent discoloration.

Your medications are as follows:
# Nurse's Worksheet - Monitoring of Clients Taking Preventive Therapy

<table>
<thead>
<tr>
<th>Regimen</th>
<th>Age</th>
<th>AST or ALT</th>
<th>CBC Platelets WBC</th>
<th>Sputum</th>
<th>CXR</th>
<th>Symptoms of toxicity and disease activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline (all age groups)</td>
<td>All</td>
<td>All except INH</td>
<td>All</td>
<td>All</td>
<td>All</td>
<td>All</td>
</tr>
<tr>
<td>INH</td>
<td>&lt; 20</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>monthly</td>
</tr>
<tr>
<td></td>
<td>≥ 20 to 35</td>
<td>1, 2 and 3 months after treatment start</td>
<td></td>
<td></td>
<td></td>
<td>monthly</td>
</tr>
<tr>
<td></td>
<td>&gt; 35</td>
<td>1, 2, 3, 6 and 9 months after treatment start</td>
<td></td>
<td></td>
<td></td>
<td>monthly</td>
</tr>
<tr>
<td>INH/Rifampin</td>
<td>&lt; 20</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>monthly</td>
</tr>
<tr>
<td></td>
<td>≥ 20 to 35</td>
<td>1, 2 and 3 months after treatment start</td>
<td>1, 2 and 3 months after treatment start</td>
<td></td>
<td></td>
<td>monthly</td>
</tr>
<tr>
<td></td>
<td>&gt; 35</td>
<td>1, 2, 3, 4 and 6 months after treatment start</td>
<td>1, 2, 3, 4 and 6 months after treatment start</td>
<td></td>
<td></td>
<td>monthly</td>
</tr>
<tr>
<td>Rifampin/PZA</td>
<td>&gt; 15 &lt; 20</td>
<td>2, 4 and 8 weeks after treatment start</td>
<td>2, 4 and 8 weeks after treatment start</td>
<td></td>
<td>2, 4 and 8 weeks after treatment start</td>
<td></td>
</tr>
<tr>
<td></td>
<td>≥ 20 to 35</td>
<td>2, 4 and 8 weeks after treatment start</td>
<td>2, 4 and 8 weeks after treatment start</td>
<td></td>
<td>2, 4 and 8 weeks after treatment start</td>
<td></td>
</tr>
<tr>
<td></td>
<td>&gt; 35</td>
<td>2, 4 and 8 weeks after treatment start</td>
<td>2, 4 and 8 weeks after treatment start</td>
<td></td>
<td>2, 4 and 8 weeks after treatment start</td>
<td></td>
</tr>
<tr>
<td>Rifampin</td>
<td>&lt; 20</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>monthly</td>
</tr>
<tr>
<td></td>
<td>≥ 20 to 35</td>
<td>1, 2, 3 and 4 months after treatment start</td>
<td>1, 2, 3 and 4 months after treatment start</td>
<td></td>
<td></td>
<td>monthly</td>
</tr>
<tr>
<td></td>
<td>&gt; 35</td>
<td>1, 2, 3 and 4 months after treatment start</td>
<td>1, 2, 3 and 4 months after treatment start</td>
<td></td>
<td></td>
<td>monthly</td>
</tr>
</tbody>
</table>
Appendix 11: Preventive Therapy Letter to Patient

Date:  

File Number:

Name:

Address:

Phone No:

DOB:

Family Doctor:

We are pleased that arrangements have been made for your treatment to prevent tuberculosis (TB). TB drugs are safe, but like any medicine they sometimes cause side effects. Tell your doctor or nurse right away if you see any changes in your health or appearance while taking the medicine. Most people don’t have problems with TB medicine.

Some changes that you should watch out for are:

☐ yellowish discoloration of skin
☐ dark tea-colored urine
☐ vomiting
☐ loss of appetite
☐ nausea

If symptoms are severe and you can’t reach your doctor or nurse then stopping the medication until you are seen by them is okay.

It is easier to remember to take your pills if you take them at the same time every day. It is best to take the pills on an empty stomach. Here are some other suggestions:

☐ Take your pills at least 30 minutes before meals, or at least one hour after meals, or at bedtime.
☐ Take the pills with milk, water, juice, soda, coffee or tea.
☐ Eat healthy food and get enough rest.
☐ AVOID excessive use of alcoholic beverages.
☐ Tell your doctor or nurse if you are taking birth control pills or if you become pregnant or about any other medications you are taking and before beginning any new ones.
☐ If you are taking rifampin, don’t worry if your urine, saliva or tears turn orange. This is a normal side effect. You should avoid the use of soft contact lenses while using rifampin as this drug may cause them permanent discoloration.

If you are planning to move, please notify your community health nurse so that arrangements can be made to continue your medication without interruption in your new community.

THIS MEDICATION MUST BE TAKEN AS DIRECTED WITHOUT FAIL to ensure you have adequate protection.

Your medications are as follows:

| TUBERCULOSIS CONTROL MANUAL | 6 - 23 |
Appendix 12: Tuberculosis Control within Alberta Health and Wellness

Tuberculosis Control within Alberta Health and Wellness

Population Health Division

Director
Provincial Health Officer
Disease Control and Prevention Branch

Dr. Richard Long
Provincial TB Consultant
TB Control
415-2805

Elaine Benjamin
Team Coordinator
TB Control
415-2806

Liz Kohle
Project Team Leader
TB Strategies
415-2760

Denise Whittaker
Contact Tracing Coordinator
TB Control
415-2814

Note: The contacts listed above can be accessed through the RITE Line at 310-0000
Appendix 13: Important Contact Names
And Phone Numbers

Please add local (regional) information as appropriate.

Regional Contacts
Regional TB Co-ordinator:
Regional TB Educator:
Contacts for TB supplies
  Mantoux solution (PPD):
  Specimen Containers for AFB:
  BCG vaccine:
  Forms:
  TB Pamphlets and other resources:

Provincial Contacts

Dr. Richard Long
  Provincial TB Consultant  Phone: 415-2805  e-mail: richard.long@gov.ab.ca

Elaine Benjamin
  Team Co-ordinator, TB Control  Phone: 415-2806  e-mail: elaine.benjamin@gov.ab.ca

Denise Whittaker
  Contact tracing Co-ordinator  Phone: 415-2814  e-mail: denise.whittaker@gov.ab.ca

Shirley Chorney
  Reporting Officer, TB Control  Phone 415-2808  e-mail: shirley.chorney@gov.ab.ca

Liz Kohle
  Educational support and resources  Phone 415-2760  e-mail: elizabeth.kohle@gov.ab.ca

The contacts listed above can be accessed through the RITE Line at 310-0000.

Ordering supplies and Resources—each region has individuals designated to order these items.
  Mantoux solution:  Order through Provincial Vaccine Depot
  Specimen containers for AFB:  Order from Provincial Laboratory
  BCG vaccine:  Order through Provincial Vaccine Depot—special order
  Provincial referral forms:  Order through TB Control
  Tuberculin Skin Test rulers:  Alberta Lung Association  1-800-661-5864
  Print Resources (see list to follow):  Fax 427-3023

Other
Appendix 14: Forms

Following the directions on how to fill out the form, is a copy of each form.
14A Directly Observed Therapy Record

This form can be used as a worksheet to monitor medication for individuals on daily or twice weekly treatment.

Information regarding how to fill the form out can be found at the top of the form.

The current prescription for TB medications should be entered in the upper right hand corner of the form. Please verify that the medications supplied match the prescription you have.

“Test results” includes results of any monitoring done such as bloodwork, audiology screening, etc.

The comment section is free for you to use to expand on any concerns you may have regarding compliance, adverse reactions, etc.

The form may be returned to TB Control once it is completed at the end of each month, or you may choose to transfer the appropriate information to the Treatment Record (see page 6-31).
The following patient has been placed on *Directly observed therapy* under your supervision. Please indicate the dates (in the parentheses) you have given and observed the medications(s) taken, by writing your initials on the appropriate date. If the medication(s) were taken on a certain date and swallowing was not observed, please indicate *not observed* on the appropriate date.

*Please return this completed sheet by the end of each month to:*

**Disease Control and Prevention**  
**Tuberculosis Control**  
10025 Jasper Avenue  
Box 1360 Stn Main  
Edmonton, Alberta  
T5J 2N3

**TB file number:**

<table>
<thead>
<tr>
<th>NAME:</th>
<th>Month and Year:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Monday</td>
</tr>
<tr>
<td>( )</td>
<td>( )</td>
</tr>
<tr>
<td>( )</td>
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<td>( )</td>
</tr>
<tr>
<td>( )</td>
<td>( )</td>
</tr>
</tbody>
</table>

*If two doses of medication are missed, please notify the Nurse at TB Control:*
  Ph: (780) 422-2444  Fax: (780) 422-5149

Contact Name and Phone Number: __________________________________________________________

Test Results: .........................................................................................................................

Comments: .............................................................................................................................

6 - 30  
**TUBERCULOSIS CONTROL MANUAL**
14B  Treatment Record and Follow-up

The Treatment Record and Follow-up form is sent along with medications supplied to public health staff by TB Control. It is used to report compliance with medications and any monitoring which has been done in relation to side effects.

This form is generated on computer by the TB Registry, and will be routinely updated as information is received from the field. When information has been submitted in a timely manner, it will provide public health staff with an up to date record of any treatment and concerns.

Please fill in any monitoring activity for the month of the report, according to the recommendations for the specific medications being taken. For example, if the client is taking Ethambutol and vision screening has been done, report the results under ‘Visual Acuity’. When reporting AST results, remember to include the normal value as reported by the lab.

Request new drugs as needed, and check for prescription changes.
### TREATMENT RECORD AND FOLLOW-UP

<table>
<thead>
<tr>
<th>Date of Intake</th>
<th>YYYY MM DD</th>
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<tbody>
<tr>
<td></td>
<td>2022-03-18</td>
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<table>
<thead>
<tr>
<th>Region</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>88 Edmonton TBS</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Address</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Name</th>
<th>Surname</th>
<th>First</th>
<th>Initial</th>
<th>DIAGNOSIS</th>
<th>D.O.B.</th>
<th>YYYY MM DD</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1700-01-01</td>
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<table>
<thead>
<tr>
<th>T.B.S. DOCTOR</th>
<th>Drug Start</th>
<th>Drug Stop</th>
<th>Reason Stop</th>
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<tbody>
<tr>
<td></td>
<td>YYYY MM DD</td>
<td>YYYY MM DD</td>
<td>YYYY MM DD</td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>MONTH</th>
<th>Drug</th>
<th>Dose</th>
<th>Frequency</th>
<th>Required</th>
<th>Taken</th>
<th>Compliance</th>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Weight</th>
<th>AST</th>
<th>Normal To</th>
<th>Platelet Count</th>
<th>Bacteriology</th>
<th>Smear</th>
<th>Culture</th>
<th>X-Ray Date</th>
<th>X-Ray Result</th>
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</thead>
</table>

<table>
<thead>
<tr>
<th>Colour Perception</th>
<th>Other Tests</th>
<th>Visual Acuity</th>
<th>YYYY MM DD</th>
<th>YYYY MM DD</th>
<th>YYYY MM DD</th>
<th>YYYY MM DD</th>
</tr>
</thead>
</table>

### SIDE EFFECTS AND COMMENTS (To be completed by TB Services)

SIDE EFFECTS AND COMMENTS (Local Health Authority)

### SEND MORE DRUGS

- [ ] Yes
- [ ] No

<table>
<thead>
<tr>
<th>Months:</th>
<th>Mail Out Date</th>
<th>Signature</th>
<th>Date</th>
</tr>
</thead>
</table>

### PRESCRIPTION CHANGES

<table>
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<tr>
<th>Date</th>
<th>Treatment to Date</th>
<th>DRUG</th>
<th>DURATION (Months)</th>
<th>COMPLIANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Signature</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

6 - 32 TUBERCULOSIS CONTROL MANUAL
14C Tuberculosis Referral Form

This form is used by staff in the regions to:

► refer a client for chest radiograph
► refer a client to Tuberculosis Control for any reason or communicate with Tuberculosis Control regarding information or recommendations

Information from this form is entered into the TB database and is transferred onto any documents relating to this client. Therefore, it is very important that as much accurate information as possible be collected. Ensure that the client understands the Health Information Act disclaimer on the form.

Consider all fields indicated with a * to be mandatory fields.

Helpful information for filling this form out:

* **Date of referral**: year/month/day you are filling in the form.

* **P H Number**: Personal Health Number – this is the universal patient identifier.

* **Region**: Name of Region forwarding information—this is usually the region in which the client lives, except perhaps in the case of jails and drug rehabilitation and detox centres.

  **Area**: Name of office or sub-office within each region that is providing service to the client.

* **D.O.B. (Date of Birth)/D.O.D. (Date of Death)**: Year/month/day.

  **Other File #**: A number which would be assigned by Regional staff to aid in regional filing systems.

* **TB File #**: Number assigned at Tuberculosis Control which can be found on all forms and correspondence relating to client. This number should be on all lab Requisitions, radiology reports, and available for telephone queries.

* **Name**: Client’s last name first (Please print clearly). First name should be the usual name the client uses. Provide entire middle name if known (in case of duplications).

  **Other (maiden, alias)**: Surname prior to marriage or other name the client may have used which might help Tuberculosis Control locate records.

  **Sex**: Male/female.

* **Address**: Client’s usual permanent place of residence (not correctional institute, residential school, etc.). This will assist in locating an individual who has been discharged from prison, detox centres, etc.

* **Postal Code**: helps to identify area client is from.

  **Phone number**: Please provide if available.

  **Other phone number**: Example—work, neighbour, etc.
Marital status: Choose one.

* Ethnic origin: Choose one. If “other”, specify only Caucasian or non-Caucasian.

* Aboriginal band and treaty number: Name and number of band in which client is registered.

* Country of birth: Indicate country client was born in (including Canada).

* Date of arrival in Canada: Provide regardless of length of time since immigration.

Occupation: Job title, and type of work if possible (e.g. Continuing care nurse, clerical in correctional facility).

Next of kin and phone number: Name and phone number of closest adult relationship. List relationship if known. This will assist you to contact the client if he/she moves without notice.

Family/referring doctor, address, postal code and phone number: If the client has a family physician, enter the information here. If not the MOH becomes the referring doctor. Please be specific, to enable Tuberculosis Control staff to discuss/consult with family physician, and to contact the physician in the event preventive therapy is recommended.

Copy to other (with address and postal code): Indicate here if health care facility (occupational health), facility, medical services, correctional institute etc. require a copy of the update.

* Tuberculin Tests: Space for 3 tuberculin results.

* BCG History: If yes, indicate the year, and indicate whether scar visible.

Immunosuppressed: Indicate reason for immunosuppression if applicable (medication or disease). If client objects to this information on form, or if reason is “HIV positive client”, indicate only “yes” on form, and obtain permission from client to phone Tuberculosis Control with this information.

Previous TB and date: If client knows this information, or if documentation is available indicating previous disease.

Province/Country: Where the diagnosis was made. This helps assess whether treatment would have been adequate.

Previous medication: Yes or No. If yes, was it for active disease or prevention (can be both).

Contact: If this client is a contact of a case, provide as much information as available about the source case and type of contact (association).

* Reason for referral: See reverse side of form for details. Choose one (primary reason).

Additional information: Any other pertinent information or comments on client that may affect his/her follow-up. Indicate symptoms, medications, any medical conditions, travel outside country, etc. If there are no symptoms, indicate this as well.

Region stamp: Name and mailing address.

* Signature of Health Nurse/Authority: Signature of health care worker.
TUBERCULOSIS REFERRAL FORM

Freedom of Information and Privacy Legislation: The personal information collected on this form is used for the purpose of enabling TB Control to carry out a screening program, and is collected under the authority of the Alberta Public Health Act.

Questions about the use and collection of this information can be directed to:
Director, TB Control, Edmonton (see above for address/phone #).

<table>
<thead>
<tr>
<th>Date of</th>
<th>P.H. Number</th>
<th>Region</th>
<th>Area</th>
<th>D.O.B. (YYYY MM DD)</th>
<th>D.O.D.</th>
<th>Region File #</th>
<th>TB File #</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Name</th>
<th>Surname</th>
<th>First</th>
<th>Middle</th>
<th>Other ( Maiden, Alias)</th>
<th>Sex (M/F)</th>
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<table>
<thead>
<tr>
<th>Address</th>
<th>Postal Code</th>
<th>Phone Number</th>
<th>Other Phone #</th>
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<table>
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<tr>
<th>Marital Status</th>
<th>Ethnic Origin</th>
<th>Other</th>
<th>Aboriginal Band</th>
<th>Treaty #</th>
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<tbody>
<tr>
<td>M</td>
<td>J</td>
<td>D</td>
<td>NW</td>
<td>CL</td>
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<table>
<thead>
<tr>
<th>Country of Birth</th>
<th>Arrival in Can.</th>
<th>YYYY MM DD</th>
<th>Occupation</th>
<th>Next of Kin</th>
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<table>
<thead>
<tr>
<th>Family/Referring Physician</th>
<th>Address</th>
<th>Postal Code</th>
<th>Phone #</th>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Copy to Other</th>
<th>Address</th>
<th>Postal Code</th>
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<table>
<thead>
<tr>
<th>Tuberculin Tests</th>
<th>Previous T.B.</th>
<th>Date</th>
<th>Prov/Country</th>
<th>Previous Medication</th>
<th>YYYY MM DD</th>
<th>Scar</th>
<th>Yes</th>
<th>No</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<table>
<thead>
<tr>
<th>Immunocompromised (Specify)</th>
<th>Previous T.B.</th>
<th>Date</th>
<th>Prov/Country</th>
<th>Previous Medication</th>
<th>YYYY MM DD</th>
<th>Scar</th>
<th>Yes</th>
<th>No</th>
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<table>
<thead>
<tr>
<th>Source Case Name</th>
<th>File No.</th>
<th>YYYY MM DD</th>
<th>Association</th>
<th>Relationship to Source</th>
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</table>

| CONTACT: | | |
|----------| | |

<table>
<thead>
<tr>
<th>REASON FOR REFERRAL</th>
<th>(Please See Reverse Side For Details)</th>
<th>Enter Referral Code From Reverse Side of Form:</th>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Explain Reason for Referral &amp; Provide Additional Information</th>
<th>Region Stamp</th>
</tr>
</thead>
</table>

Signature of Health Nurse/Authority

TUBERCULOSIS CONTROL MANUAL 6 - 35
REASON FOR REFERRAL

Please select the primary reason for referral if more than one applies and transverse to referral section. If forwarding x-rays, please include previous for comparison.

IMMIGRANT
- 101 Landed (Inactive TB Status)
- 102 Newcomers’ Clinic
- 103 Student Visa
- 104 Refugee
- 105 Applicant Landed Status
- 106 Visitor/Working Visa

EMPLOYMENT
- Occupation: ________________________________
- Employer: ________________________________

- 201 Acute Care Hospital
- 202 Long Term Care Hospital
- 203 Correctional Facility
- 204 Detox / Rehab
- 205 Child Care Workers
- 206 Private Lab
- 207 Medical Examiners
- 208 Other Employment

SCHOOL SCREENING
- 301 Grade School
- 302 Post Secondary
- 303 Household Review of Positive Reactors

INSTITUTIONAL LIVING
- 401 Admission LTC
- 402 Long Term Care Follow-up
- 403 Correctional Facility
- 404 Remand
- 405 Detox / Rehab
- 406 Psychiatric Hospital
- 407 Communal Living

SYMPTOMS
- 501

CONTACT
- 601

IMMUNOSUPPRESSED
- 701 Renal Failure
- 702 Transplant
- 703 Medication
- 704 Other Diseases

OTHER
- 901 Lab
- 902 Post Mortem
- 903 TBS Request Other
- 904 TBS Survey
- 905 Old Case Review
- 906 Radiology Report
- 907 Pathology
- 999 Other (must be accompanied by explanation on previous page)
14D Tuberculosis Update Form

This form is initiated at Tuberculosis Control and sent to local health offices to communicate recommendations, or to request specific follow-up in the community. It is generated using information provided to Tuberculosis Control on the TB Referral form, or information received from other sources (e.g. facility if client has been hospitalized).

It is only as accurate as the information supplied at the time of referral. If errors are recognized, please correct and return to Tuberculosis Control.

Additional information found on this form includes:

**Contact:** If the client is a contact of a diagnosed case, this will provide information about the source case file number and date of contact. To ensure confidentiality, names will not be given.

**Source Case Sputum:** Will indicate whether the source case is smear or culture positive or negative. (this is useful information for decisions regarding priorities for contact tracing).

**Association:** Close or casual, and relationship to the source case—to assist with decisions around contact tracing.

**TB Doctor:** Indicates name of TB physician reviewing the case.

**TB Diagnosis:** Indicates if this client has been diagnosed with active or inactive TB (culture presently or previously positive for AFB), is suspected of having active TB disease (awaiting culture results, or clinical diagnosis only) or presumed inactive (never diagnosed with TB, but radiographs indicative of old disease).

**Treatment Adequate:** Yes or no will be indicated. Medications used, and length of time taken will be specified.

**Preventive Therapy:** Indicates if preventive therapy was recommended and the reason for the recommendation, as well as whether it was accepted or not.

**Reason Stopped:** The reason this client is no longer on preventive medication. This will indicate such things as refusal, adverse reactions, treatment complete, etc.

**Non-case:** This indicates any case that does not have a diagnosis of *M. tuberculosis*. It may include localized fibrosis, healed primary complex, atypical Mycobacteria, BCG complication, etc. It will also indicate whether the client is a contact of known case.

**Action:** Follow-up recommendations will be checked in this column, with the date required.

**Radiograph:** Complete the TB Referral Form (as a requisition form) and refer client to nearest radiograph facility. These radiographs will then be forwarded to Tuberculosis Control or the appropriate clinic.

**Sputum:** Obtain 3 samples whenever possible.

**Urine:** Collect urine for AFB.
CBC/Platelets: If complete blood count is required, this will be circled. If only platelets are needed this will be indicated. The local health office sends client to lab with requisition for work needed. Indicate copy to Dr. Richard Long to ensure results are also forwarded to TB Control.

AST: Liver function test (AST or ALT)—Send client to lab as above, and ensure copies sent to TB Control.

Tuberculin: Client requires tuberculin skin test—report result to Tuberculosis Control.

Initiate Treatment: This indicates that the recommendation from the TB physician in to begin treatment, and the date of the recommendation.

Continue Treatment: Confirms that recommendation for treatment is still current, and that client should continue.

Symptom Inquiry: Question the client to see whether any of the symptoms relating to TB are present. (See page 2-6).

Visual Tests: Visual acuity and colour perception both need to be done. This recommendation is usually only for clients taking Ethambutol.

Report Compliance: Determine the client’s compliance with taking medications (either current treatment or past). Report compliance to Tuberculosis Control by filling out the preventive therapy or treatment record and follow up form (see page 6-42 or 6-31) and forwarding as requested.

Appointment: Indicates the client has (or needs) an appointment at TB clinic to see a TB physician.

Annual Follow-up: This is a common recommendation for some clients who refuse, or cannot tolerate preventive therapy. It indicates that radiograph and sputum need to be done yearly with this client.

Other: Indicates if any other recommendations are being made.

No Further Follow-up is necessary unless symptoms or further exposure: Indicates that client does not require any routine follow-up, but that referral should be made if indicated in future.

X-ray Date: Date the last radiograph was taken. The TB Physician will indicate whether the radiograph is normal and whether stable, deteriorated, improved or cavitary.

X-ray Location: This is the radiology department where the radiograph was done, and usually where the radiograph is stored after being seen by the TB Physician.

Sputum Date: This will indicate when the sputum was collected, and whether the lab report indicated smear and culture negative or positive for AFB.

TB Services Consultation: This area is for information from any area that needs expansion, as well as the TB physician’s dictation of recommendations/findings. This area will also indicate who else received a copy of the form.

Information on this form is only as accurate as the information that has been supplied to TB Control.
|---------------------------|--------|--------|------|------------------|-------------------|---------------------|------------------|

<table>
<thead>
<tr>
<th>Name: Surname</th>
<th>First</th>
<th>Middle</th>
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<th>Sex:</th>
<th>Marital Status:</th>
<th>Ethnic Origin:</th>
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<td>Province</td>
<td>Postal Code</td>
<td>Phone Number</td>
<td>Other Phone #:</td>
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<th>Next of Kin</th>
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<table>
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<th>Address</th>
<th>Copy to Other</th>
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|----------------------|-----|-----------|-----------|-----------|------------------|-----------------------|

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<tr>
<th>Immunosuppressed: (Specify)</th>
<th>Previous T.B. Date:</th>
<th>Prov/Country:</th>
<th>Previous Medication:</th>
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**REASON FOR REFERRAL:**

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<tr>
<th>Source Case File No.</th>
<th>Date</th>
<th>Source Case Spolium</th>
<th>Association</th>
<th>Relationship to Source</th>
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**CONTACT:**

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<tr>
<th>T.B. Doctor</th>
<th>T.B. Diagnosis</th>
<th>X-Ray Date:</th>
<th>Normal:</th>
<th>Yes:</th>
<th>No:</th>
<th>Stable:</th>
<th>Improved:</th>
<th>X-Ray Location:</th>
<th>Sputum Date:</th>
<th>Sputum:</th>
<th>Labeled:</th>
<th>smear:</th>
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**Preventive Therapy:**

<table>
<thead>
<tr>
<th>Acceptable</th>
<th>Reason Stopped</th>
<th>Treatment Adequate: Yes:</th>
<th>No:</th>
<th>Specify</th>
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**NON-CASE:**

<table>
<thead>
<tr>
<th>Contact</th>
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</table>

**ACTION:**

<table>
<thead>
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<th>Due Date: YYY MM DD</th>
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<table>
<thead>
<tr>
<th>X-Ray Chest</th>
<th>Spolium</th>
<th>Urine</th>
<th>CBC/Platelets</th>
<th>AST</th>
<th>Tuberculin</th>
<th>Initiate Treatment</th>
<th>Continue Treatment</th>
<th>Symptom Enquiry</th>
<th>Visual Tests</th>
<th>Report Compliance</th>
<th>Appointment</th>
<th>Annual Follow-Up</th>
<th>Other</th>
</tr>
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</table>

| No further follow-up is necessary unless symptoms or further exposure. |

<table>
<thead>
<tr>
<th>No Copies:</th>
<th>File Only:</th>
<th>Signature:</th>
<th>Date:</th>
</tr>
</thead>
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**TUBERCULOSIS CONTROL MANUAL** 6 - 39
14E  Recommendation for Preventive Therapy

This form is used by TB Control to indicate the recommendation for preventive therapy for this client.

- Copies are sent to the family physician and to local public health offices when this recommendation is made.
- It is then up to the family physician, in consultation with the Public Health Nurse and the client, to decide if the recommendation will be followed.
- Once this decision is made, the form should be returned to TB Control, indicating whether or not the recommendation for preventive therapy will be accepted, and if not, the reason for the refusal.

This form is generated on the computer with information supplied to TB Control at the time of referral.

**This person has been recommended preventive therapy by Tuberculosis Control Doctor:** This will indicate the name of the TB Doctor making the recommendation, as well as the reason for making it.

**If in agreement with the above recommendation:** This section is for the family physician and the Public Health Nurse to fill in.

**Family Doctor signature:** Indicates the physician’s agreement with the recommendations from Tuberculosis Control.

**Public Health Nurse signature:** Indicates the Public Health Nurse has discussed preventive therapy with the client, the client is aware of the recommendation, and has agreed to it.

**Pre-INH AST/ALT:** AST or ALT needs to be done prior to administration of INH, to ensure liver enzymes are normal before initiation of treatment. This also serves as a baseline when monitoring for the development of liver toxicity in clients on this medication.

**Weight:** This is needed to ensure correct dose of medication.

**Symptoms:** Does this client have symptoms suggestive of TB disease at this time?

**Sputum submitted:** Yes or No.

**Hold preventive therapy for culture results:** Yes or No—if there is any concern that this client might have active TB, check this box to ensure treatment with 1 drug is not started prior to ruling out active disease.

**Return to:** Indicates where the signed form should be sent.

**If preventive therapy is not taken, follow-up:** This section will indicate what follow-up is needed if decision is made not to take preventive therapy.

**Current treatment:** This section is for use by TB Control.

**c.c.:** copies of this form were also sent to…

**Indications for preventive therapy:** A reminder for those involved what the indications for preventive therapy would be.

Information on this form is only as accurate as the information that has been provided to TB Control.
RECOMMENDATION FOR PREVENTIVE THERAPY

Disease Control & Prevention, TB Control
10025 Jasper Avenue
Box 1360 Str Main
Edmonton AB T5J 2N3
Phone: (780) 422-2444 Fax: 422-8149

<table>
<thead>
<tr>
<th>Date of Intake</th>
<th>PHN</th>
<th>Region</th>
<th>Area</th>
<th>D.O.B. YYYYY MM DD</th>
<th>D.O.D.</th>
<th>Region File #</th>
<th>TB File #</th>
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<td></td>
<td>1700-01-01</td>
<td></td>
<td>0601622</td>
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</table>

- Name
- Surname
- First
- Middle
- Other (Maiden, Alias)
- Sex [ ] M [ ] F
- Address
- Street
- City
- Province
- Postal Code
- Phone Number
- Other Phone

Copy to Family/Referring Physician: Address

This person has been recommended preventive therapy by TBS Doctor: ____________________________

Reason: ____________________________ Date: ____________________________

TBS Doctor Signature

If in agreement with above recommendation,
Please sign:

Family Doctor Signature: ____________________________ Date: ____________________________

Public Health Nurse Signature: ____________________________ Date: ____________________________

Pre-Meds AST/ALT: ____________________________ Normal to: ____________________________

Weight (kg): ____________________________

Return To: Alberta Health

Disease Control and Prevention
10025 Jasper Avenue
Box 1360 Str Main
Edmonton, Alberta T5J 2N3

If preventive therapy is not taken, follow up: ____________________________

Current treatment: ____________________________ Date: ____________________________

Signature: ____________________________

CC:

Indications For Preventive Therapy

- contacts of infectious cases
- skin test converters (recorded negative within two years)
- lung lesions, never treated or inadequately treated
- positive reactors under age of 36
- positive reactors at high risk due to:
  - HIV infection
  - poorly controlled diabetes
  - organ transplant
  - cancer
  - renal disease
  - IV drug users
  - corticosteroid therapy (long-term use)
  - foreign born from high prevalence countries

NOTE: Persons who are non-reactors and are severely immune suppressed by HIV infection, corticosteroids, transplantation, immune suppression or at high risk because of lifestyle should be considered for preventive therapy once active disease has been ruled out with sputum culture and chest x-ray.
**14F Preventive Therapy**

This form is used primarily by public health staff to communicate with TB Control regarding preventive therapy activity. It will accompany medication sent to health regions for distribution to clients, and is used to:

- Provide a report of drug compliance, possible toxicity and adverse reactions to TB Control
- Order further medication
- Provide a case summary of the completed treatment regimen

Updated copies of the preventive therapy form are forwarded to TB Control every 2 months.

TB Control will fill in the top portion of the form, including identifying information and information about recommended preventive therapy, with information from their files.

If any information is missing, it is because they have not yet received it, (for example, AST result, weight, medication start date).

**Pre-INH AST:** Medication should not be started until this value is known. If high, consult with TB Control or the TB Clinic, and inform the family doctor before having client start on medication.

**Normal to:** This information (given as a range) will be found on the lab report, and is important to note as it tells whether the value is truly normal or not.

**Meds Started:** TB Control does not have this information until provided by the staff monitoring medications.

**Meds Stopped:** At the completion of treatment (see page 5-8), public health staff will need to fill this in so that it can be entered into the database.

**Date:** Year, Month, Day.

**Drug, Dose, Frequency:** This will usually be completed by TB Control.

**Required:** This is the number of doses which should have been taken since last report.

**Taken:** This is the number of doses actually taken since last visit.

**Compliance:** TB Control will complete this once information from previous months is received.

**Weight, AST, Platelet Count, etc:** These are filled in whenever applicable.

**Side-effects and comments:** This space is for health staff to indicate any concerns, adverse reactions, excellent or poor compliance, etc.

**Send More drugs:** Be sure to check Yes or No, and add how many month’s supply you need (not more than 2 or 3).

**Current prescription:** Check this against medications on hand—sometimes the prescription changes according to culture sensitivities or adverse reactions to medication.

**Treatment to date:** Summary of duration of medications and client compliance.
## PREVENTIVE THERAPY

<table>
<thead>
<tr>
<th>Date of Intake</th>
<th>YYYY MM DD</th>
<th>P.H.N.</th>
<th>Region</th>
<th>Area</th>
<th>D.O.B. YYYY MM DD</th>
<th>D.O.D.</th>
<th>Region File #</th>
<th>TB File #</th>
</tr>
</thead>
</table>

### Name
- Surname
- First
- Middle
- Other

### Address
- Street
- City
- Province: AB
- Postal Code
- Phone Number
- Other Phone

### Reason
- Recommended By: T.B.S. Dr.
- Date
- Agreed to by: Family Dr.
- Date

### Pre Meds
- Ast: Normal To
- Weight (Kg): Follow-up:
- Meds Started: Meds Stopped:
- Reason: Medication Stopped

### Date
- Drug
- Dose
- Frequency
- Required
- Taken
- Compliance
- %

### Weight (kg)
- Other Tests:

### SIDE EFFECTS AND COMMENTS

(To be completed by TB Services)

### Send more drugs
- Yes
- No
- Months:
- Mail Out Date
- Signature
- Date

### CURRENT PRESCRIPTION
- Date
- Treatment to Date
- DRUG
- DURATION (Months)
- COMPLIANCE
- %

### Signature
This form is used to:

- initiate follow-up investigation of contacts
- identify those persons who need surveillance because of association with an infectious case of tuberculosis

This form is used to provide information about contacts of active cases of tuberculosis to TB Control or the TB Clinic, in order to assist in the co-ordination of contact tracing in the community.

If the client is hospitalized, the form will be initiated by staff in the facility. A copy of the pertinent information will be faxed to all applicable areas as soon as practical.

The form is also used to communicate the results of contact follow-up and any further contact information to TB Control. Attempts should be made to complete this form and return to TB Control or the TB Clinic within 30 days. **New** contact information should be communicated within 1 week of receipt of the information.

**Source Case and DOB:** This is the person in hospital or in the community who has been diagnosed with TB.

**TR# (treaty number):** If patient is aboriginal with treaty status.

**Address and Telephone Number:** Home address and phone as given by patient.

**Parent/Spouse:** Next of kin.

**Place of Employment:** For contact follow-up.

**Hospital:** The facility where the patient was interviewed.

**Admission Date:** If patient was admitted to hospital.

**Attending Physician:** Physician under which the patient was admitted.

**Diagnosis:** Pulmonary or non-pulmonary status.
Bacillary Status:
Smear positive
  • not necessarily TB (may be non-tuberculous mycobacterium)
  • if it is TB it will be infectious
Culture positive
  • may be less infectious, but definitely TB.
Non-infectious
  • most likely non-pulmonary TB.

Contacts Reported by Phone and Date: Yes or no.

Identification of Contacts: This will indicate who interviewed the client to get a list of the known contacts, and the date the interview was done.

Recommendations (Follow-up Investigations): This will contain information from TB Control staff to assist Public Health nurses in their follow-up.

Contact Information: Information is divided into close and casual, household and non-household contacts. If any section here is circled, (e.g., DOB), attempt to provide the information as soon as possible.

Tuberculin status: Dates of tuberculin skin testing should be entered, along with results. If previous positive result is known, this should be recorded.

Comments: Look here for more direction from TB Control if further testing is needed.
Appendix 15: Interview Checklist

The following information should be considered as part of any patient interview, in preparation for development of a contact investigation list.

☐ Client’s name
☐ Client’s home address and phone number or names of shelters
☐ Location and date of interview
☐ Household members or others present at interview (name, age, relationship to patient, addresses)
☐ Client’s symptoms and approximate date when each started
☐ Places client has been since symptoms began
  ☐ Household or residence
  ☐ Work or school
  ☐ Leisure or recreation activities
☐ Description of client’s daily routine
  ☐ Transportation to and from work
  ☐ Type of work
  ☐ Daytime/evening/night-time/weekend activities
☐ Other regular activities (not daily)
☐ Other sites visited less regularly during period of infectiousness
  (eg. trips, vacations, holiday activities)
☐ Contacts identified (organized by site)
  ☐ Household members (especially those who share the same sleeping space)
  ☐ Frequent guests or visitors to the home (including visitors of other family members)
  ☐ Co-workers, school classmates
  ☐ Friends and other social contacts
  ☐ Girlfriends, boyfriends or sexual partners
Appendix 16: Resources

These resources can be ordered from the AH&W warehouse

TB01  Why take medicine? To prevent TB

TB02  Tuberculosis is Back (pamphlet)

TB03  Tuberculosis Teaching Package

TB04  Tuberculosis? Please Tell me More (coil bound)

TB05  TB Worldwide (Poster)

TB06  Canadian Tuberculosis Standards

TB07  Tuberculosis Pill Dispenser Manual

TB08  Tuberculosis? Please Tell me More (colouring book)

TB09  Tuberculosis Control and Management Project for Long Term Care

TB10  Guidelines for Preventing the Transmission of TB in Hospitals and Other Institutional Settings

TB11  Tuberculin Skin Test Guidelines (pocket sized—ENGLISH)

TB12  Tuberculin Skin Test Guidelines (pocket sized—FRENCH)

TB13  Tuberculin Skin Test Guidelines (large)
Appendix 17: Respiratory Isolation Guidelines for Tuberculosis Control

The following guidelines have been developed to help Regional Health Authorities (RHA's) in meeting respiratory isolation requirements and determining when and where infectious cases of tuberculosis should be isolated and for how long. They recognize that the overall goal of public health programs must not be merely the provision of healthcare to those who may be marginalized but a systematic commitment to protect the health of the general public in a time of increasing globalization. As it is not possible for any guideline to address all potential situations, clinical judgement must always be exercised.

Terms & Definitions

1. **Airborne precautions** - measures designed to reduce the risk of airborne transmission of infectious agents such as *M. tuberculosis*.

2. **Infectious tuberculosis** - tuberculosis disease of the respiratory tract, capable of producing infection or disease in others.

The most infectious cases are thought to be those that are smear-positive in spontaneously expectorated sputum. For patients who have no sputum or are smear-negative on examination of spontaneously expectorated sputum, then gastric aspirates, sputum induction and fiberoptic bronchoscopy are increasingly used, because they have a high yield and allow earlier diagnosis of tuberculosis. Although most patients whose TB is diagnosed with these alternative methods have shown minimal or moderately advanced disease on radiographic examination, some series reported that as many as one-third had advanced or cavitary disease and between 22% and 35% of specimens from these alternative techniques were smear positive. Therefore the question of the contagiousness of such patients arises frequently but, to date, has not been studied directly. In the absence of any solid epidemiologic information it is prudent to consider the results of these alternative diagnostic methods as equivalent to the results from spontaneously expectorated sputum. Thus, patients with “respiratory secretions” of any kind that are smear-positive are regarded as being the most infectious to others.

Patients whose respiratory secretions are smear-negative but culture-positive have fewer bacilli and so generate fewer infectious particles. However, it must be understood that the reduced bacillary concentration of their sputum may be offset by other factors, such as laryngeal involvement, younger age, or more frequent cough. In addition transmission may be enhanced by crowding, low air exchange rates or longer duration of contact.

3. **Isolation** - the separation from other persons of a person with known or suspect infectious tuberculosis in a place and under conditions that will prevent the transmission of the infection.

4. **Suspect…tuberculosis** - an illness marked by symptoms, laboratory tests, or radiographic findings consistent with, or indicative of, tuberculosis.
5. **Directly observed treatment (DOT)** – the standard method of delivering treatment to infectious pulmonary tuberculosis patients whereby a trained person watches and records each dose of TB medication as it is swallowed.

**Purpose**
The purpose of isolation is to ensure that further transmission of tuberculosis does not occur when an individual is suspected or known to have infectious tuberculosis. This applies both to voluntary isolation, when the affected person is accepting of isolation measures, and to non-voluntary isolation due to lack of agreement or understanding on the part of the affected person. The most effective means of rendering someone non-infectious is through prompt initiation of effective treatment.

**Legislation**
The Communicable Disease Regulations of the Public Health Act is the Provincial legislation that governs the handling of suspect or infectious tuberculosis. Alberta Health & Wellness - Tuberculosis Control (TB Control) and the RHAs have a responsibility to ensure that isolation is provided when deemed necessary for all individuals who have suspect or confirmed infectious tuberculosis in order to prevent and control the transmission of *M. tuberculosis*.

Every person known to have or suspected of having a communicable disease is required to “submit to the treatment directed and comply with any other conditions prescribed by the physician until the physician is satisfied that he is not infectious” (Province of Alberta - Public Health Act, Communicable Diseases Regulation, pg. 16). "In the case of pulmonary tuberculosis in an infectious form, modified (respiratory) isolation procedures apply until the person is no longer infectious” (Province of Alberta - Public Health Act, Communicable Diseases Regulation, pg. 43).

**Guiding Principles**
TB Control will work closely with the RHAs to determine the need for airborne precautions and isolation of persons with suspect or confirmed infectious tuberculosis.

Isolation can be successfully implemented and maintained in different environments. **Recognizing that each individual and situation is unique, determining where isolation is best carried out will involve careful consideration of the complex interaction between health status, living conditions, and available resources.**

TB Control and RHAs will work collaboratively to ensure appropriate isolation and management of tuberculosis disease in an environment most suited to achieving the desired outcome, while at the same time causing the least disruption to the individual and health system. If persons can be safely maintained in their home environment without danger to themselves, their family or the general public, TB Control and RHAs will encourage and support this.
Isolation may be viewed as a continuum, where a person’s placement along the continuum at any given time during treatment is dependent upon the availability and optimization of, or limitations imposed by, individual and health system resources.

**Isolation Preplanning**

A. Identify locations available within the Region where individuals who need isolation/airborne precautions can be housed when home isolation is not appropriate.

Such a facility may need to house a patient with suspect active disease. Ideally the location would have a negative pressure room that meets requirements for isolation of infectious tuberculosis patients (see *Guidelines for Preventing the Transmission of Tuberculosis in Health Care Facilities and Other Institutional Settings*) and an infection control plan that ensures competency in carrying out isolation/airborne precautions.

1. Contact administrators of potential locations to develop a preparedness plan.
   a. In preparation for individuals who will need inpatient care, establish the facility’s ability to meet care and treatment needs.
   b. Identify Public Health service’s responsibility regarding tuberculosis care and treatment.
   c. Describe how facility staff, service providers and the community can play an important role in regional readiness for immediate care and treatment of active tuberculosis.

2. Provision of basic TB education to facility personnel can help assuage fears or misconceptions about tuberculosis. Information to consider covering may include pathogenesis, transmission, and treatment of tuberculosis as well as concepts concerning isolation and airborne precautions.

B. Identify services within the Region that can be accessed to facilitate addressing unique needs of patients requiring isolation.

1. Medical Needs (Physician Services etc.)
2. Education Needs
3. Social Services Needs
4. Transportation Needs

C. Identify who in the region will delegate or carry out the risk/needs assessments upon receiving report of a suspect or confirmed infectious case of tuberculosis in the region.
Risk & Needs Assessment

A. Assess patient’s health status and relevant medical history upon receiving verbal or written notification of a suspect or confirmed infectious tuberculosis case within the region.

1. Consider the following when evaluating the extent of the individual’s TB disease and anticipated infectiousness:
   a. Forceful productive cough
   b. Hemoptysis
   c. Hoarseness
   d. Evidence of cavitary lesions on chest radiograph
   e. Presence of AFB on smear of expectorated sputum

2. At risk for drug toxicity or complications due to co-morbidity:
   a. History of liver disease
   b. History of or recently documented HIV disease
   c. History of substance abuse
   d. Use of multiple other drugs

3. At risk of drug-resistant tuberculosis:
   a. Past history of treatment of TB disease
   b. Infection with or contact with drug-resistant tuberculosis

Some type of respiratory isolation needs to be considered in all those whose airway secretions are AFB smear-positive; airway secretions to include spontaneously expectorated sputum, induced sputum, gastric aspirates, auger suction, bronchoscopic washings or brushings, bronchoalveolar lavage fluid and endotracheal or tracheal tube suctionings. It should also be considered during the first two weeks of therapy in those whose airway secretions have been determined to be culture-positive but smear-negative. In the event that the specimen determined to be culture-positive but smear-negative was collected at some time in the past, it is recommended that the present smear status of spontaneously expectorated sputum be determined if indeed spontaneous sputum is obtainable.

B. Assess living situation/environment within 12 to 48 hours of receiving verbal or written notification of a suspect or confirmed infectious tuberculosis case within the region.  
[Refer to Form #1, Isolation Assessment Form]

1. Ensure that the health staff (community and/or hospital) who will have contact with the individual have been trained and are competent in following respiratory isolation precautions, including staff protective measures.

2. Assess the individual’s environment for factors that increase the risk of tuberculosis transmission to susceptible persons.
   a. Determine if the individual lives in a congregate setting where the air space is shared by many.
The following types of settings are considered high risk for transmission of tuberculosis:

- Correctional centres
- Hospitals
- Long-term Care facilities/Nursing homes
- Mental Health institutions
- Drug & Alcohol treatment centers
- Homeless shelters
- Living accommodations, including apartment and/or single room occupancy hotels, if air from one room is circulated to other rooms through the building ventilation system.

b. If the individual lives in a congregate setting, establish the nature of the ventilation system and whether air is recirculated within the building (i.e. Does air from residential suites get filtered? Is it re-circulated or is it vented to the outdoors?).

c. Determine if the individual lives with or has other close contact with persons at greater risk for TB disease if infected (i.e. children aged 5 or under or persons who may be immunocompromised). (See Contact Investigation Section of TB Control Manual)

d. Determine if the individual provides services within the home to members of high-risk groups. (Refer to TB Control Manual - Section 2, Screening Programs)

3. If residence environment does not identify high-risk or susceptible contacts, consider feasibility for implementing isolation/airborne precautions there.

C. Assess for individual factors that may influence the person’s ability to adhere to isolation/airborne precautions, such as: (See Sample Form #1 – Isolation Assessment Form)

1. Substance abuse.
2. Mental or emotional problems.
3. Chronic medical conditions that will increase the risk of transmission of tuberculosis, such as the need for dialysis, medical follow-up appointments, etc.
4. Beliefs affecting their understanding or acceptance of having tuberculosis disease, especially understanding of the ability to transmit TB to others.
5. Previous treatment failures for tuberculosis (either active TB disease or latent TB infection) or evidence of non-compliance with other treatment regimens.
6. Support systems available to the patient to assist in maintaining activities/responsibilities of daily living (i.e. care of children, grocery shopping, laundry, bill paying, medical or other appointments, obtaining medication, spiritual needs, other relationships, etc.).
A. Discuss findings of risk/needs assessment with the Regional TB Coordinator and/or the Medical Officer of Health and determine options for isolation.

1. For non-hospital isolation:
   a. Consider resources available within the region for addressing identified risks and/or needs.
   b. Determine whether isolation can be maintained in current living environment.
   c. In the event the current living situation is not appropriate, (e.g. congregate living site, or site where there is shared air through the building ventilation system or where infants and young children also reside), consider what arrangements can be made to secure an alternative living environment within the community. (Preparations conducted during the preplanning can assist in ensuring a good transition for both patient and the community).
   d. Obtain one or two contact names and phone numbers from the patient in case they are not home when you go to visit (someone who would know if they went to the hospital unexpectedly etc.).
   e. Individualize and review the initial Plan until it is safe, yet workable for the individual and he/she demonstrates satisfactory recall and/or verbalizes the intent to adhere to the Plan. A verbal or written contract for adherence to the required behaviors and actions may help the person and the family to understand what is expected and may help the public health staff as well. 
      [See Sample Form #2 – Voluntary Isolation Contract]
      • Identify who will deliver DOT.
      • Identify in writing, the list of persons who are allowed to remain in the residence or visit while the individual is under the isolation restrictions.
      • Discuss activities that the individual can safely perform without putting others at risk (such as walking outside if it presents no risk).
   f. Use all available means to promote cooperation and support adherence. Consider use of incentives and enablers (e.g. food, personal items, vouchers, books, videotapes, toys, and assistance with housing or personal needs.) Refer to “Improving Patient Adherence to Tuberculosis Treatment” published by the Centers for Disease Control and Prevention (CDC) 1994.

2. Where isolation in the community is not appropriate or feasible, hospitalization may be required. Determine where hospitalization will occur:
   a. Refer to Regional Tuberculosis Isolation Room Capacity list for hospital isolation rooms within the region.
   b. When appropriate, arrange for admission to the communal tuberculosis unit on 5C3 at the University of Alberta Hospitals. This unit is a Provincial resource for the extended isolation of tuberculosis patients who are recalcitrant, drug-resistant, drug-intolerant or who are potentially contagious but not suitable for home isolation.
B. Assess knowledge and provide information to the individual and other relevant support persons on the disease, care and treatment, and the need for isolation.

1. Ensure information on isolation/airborne precautions is emphasized early on to allow the addressing of issues that may affect maintaining isolation. Reinforce need for isolation and treatment messages as case management proceeds. Provide basic education about tuberculosis, including the following information:
   - The disease process as relevant to the person with a new initial diagnosis adjusting to isolation (give more details later as person adjusts).
   - The airborne nature of transmission and the risk to others with close, prolonged contact.
   - The importance of covering mouth and nose when coughing and sneezing. A mask worn by someone with tuberculosis does not protect others.
   - Review with the individual facts on M. tuberculosis giving appropriate written materials in the person's own language and/or with use of a good interpreter. [Information & materials available through TB Control]
   - Review and instruct on the medication regimen and importance of routine tests for monitoring treatment progress.

2. Provide ample time for feedback from patient, family and health care staff. Ask open-ended questions to evaluate understanding.

C. Begin isolation discharge planning. Identify expectations around continuation of treatment once isolation is discontinued.

a. Who will provide DOT?
b. Where will DOT be delivered?
c. How long will DOT be delivered and will it be daily or intermittent?

1. Identify resources/services required to support adherence to treatment regime.
   a. Will transportation need to be arranged?
A. Maintaining the Plan

1. The Public Health Nurse (liaising as necessary with the Medical Officer of Health, attending
physician, and Tuberculosis Control) has immediate responsibility for the management of each
case. They or their designate will visit the individual as often as necessary to monitor the clinical
condition, ensure delivery of DOT, evaluate for medication side effects and ensure adherence with
isolation while building rapport with the client. This may include unannounced home visits to
assess adherence to isolation. [RHA may want to establish a minimum visit frequency;
requirement is not prescriptive; medical officer remains responsible.]

2. Review and re-emphasize at each visit the importance of taking the treatment and staying at home
or maintaining the previously agreed upon airborne precautions. Encourage the patient to
discuss/share any challenges faced regarding the isolation restrictions. Assist in addressing issues
as they arise.
   a. Look for signs that the individual may be having difficulty coping with the isolation
      and visitor restrictions.
   b. Work with the person to determine ways to maintain contact with significant others who cannot
      visit until the infectious period is over.

3. Regularly revisit the Plan, consulting the patient’s family physician for any medical issues, to
ensure that it is least disruptive to the individual’s life and still supports the goals of optimal
treatment and protection of others.

Evaluating Response to Treatment

1. Assessing adequacy of treatment in light of drug-susceptibility test results
2. Mycobacteriology
3. Symptom improvement
4. Radiographic improvement

4. Recalcitrance

If an individual refuses or neglects to comply with conditions that have been prescribed by a
physician as necessary to mitigate tuberculosis or limit its spread to others, a certificate may be
issued by a Medical Officer of Health to apprehend and detain the person for that purpose. Legal
confinement, however, is used as a last resort. [See also TB Control Manual Section 3, Case
Management]

The Provincial Medical Consultant for Tuberculosis, Provincial Health Officer, Regional Medical
Officer of Health or Medical Officer of Health for First Nations and Inuit Health Branch may issue
such a certificate whenever indicated. A person in respect of whom a certificate is issued may apply
at any time for cancellation of the certificate. Recalcitrant patients may also be held under an
“Isolation Order” (Section 44 of the Public Health Act).
D. Release from isolation

1. Although criteria for discontinuing TB isolation precautions in patients confined to health care facilities or other institutional settings are quite explicit (Guidelines for Preventing the Transmission of Tuberculosis in Canadian Healthcare Facilities and Other Institutional Settings, CCCR, April 1996, vol 2251, and Guidelines for Preventing the Transmission of Tuberculosis in Health Care Facilities and Other Institutional Settings, Alberta Health), criteria for the release from isolation, whether it be hospital or non-hospital, back to the community or workplace, are less explicit. The following guidelines are recommended:

   a. In patients whose airway secretions have been determined at the outset of treatment to be smear-positive: it is recommended that they not be released from respiratory isolation, back into the community or workplace, until at least three consecutive spontaneously produced sputum smears (on separate days) are negative. unless it can be said with reasonable certainty that they are not returning to a setting where transmission to new previously unexposed contacts is possible (e.g. crowded living quarters, low air exchange rates, longer duration of contact) or where there may be exposure to new contacts who are at high risk to progress to disease were they to become infected, e.g. children, the immunocompromised. If it can be said that these do not apply then the patient may be released from isolation after a minimum of three weeks of effective treatment (see c, d and e below), and without the necessity of submitting three sputa for AFB smear and culture.

   b. In the event that the initially smear-positive patient, although cooperative, cannot subsequently produce sputum spontaneously or in the event that the patient’s airway secretions were smear-negative at the outset: it is recommended that they not be released from respiratory isolation until they have completed a minimum of two weeks of effective treatment (see c, d, e below).

   c. There is clinical evidence of improvement; and

   d. Drug susceptibility tests have determined that the patients isolate is being treated with an adequate regimen, or in the event that drug susceptibility tests are not yet available, the risk of drug resistance is considered to be very low.

   e. There is evidence of adherence to the prescribed treatment regimen for a minimum of two weeks and the delivery of DOT has been successful.

2. Specific arrangements should be made for post-isolation care; the post-isolation plan should include arrangements for ongoing treatment and follow up care.

3. Continue case management and follow up care until prescribed therapy is completed.

4. Review and implement Discharge Plan.
References (for Appendix 17)

Alberta TB Control Manual

American Thoracic Society. *Diagnostic Standards and Classification of Tuberculosis in Adults and Children.* April, 2000


California Department of Health Services and Executive Committee, California Tuberculosis Controllers Association. *Guidelines for the Placement or Return of Tuberculosis Patients into High Risk Housing, Work, Correctional, or In-Patient Settings.* (1997).


Wisconsin doc. – *Isolation Preparedness & Implementation.*

Centers for Disease Control and Prevention. *Improving Patient Adherence to Tuberculosis Treatment.* (1994).

Sample Form #1 –Isolation Assessment Form

ISOLATION ASSESSMENT FORM

Date: ________________________

Client Name _______________________________ DOB ________ TB File #: __________

Address __________________________________________________ Postal Code ________

Home Phone ____________________________ Physician name & phone: ____________________________

Contact Person / Next of Kin & phone: ____________________________________________

Community / Home Environment

1. Community Location (describe): ____________________________________________

2. Availability of and accessibility to health services (describe): ____________________________

3. Current living situation:  ☐ Stable  ☐ Unstable

   Type of residence (describe):  ☐ House

   ☐ Apartment / Condo

   ☐ Institution (LTC facility, correctional facility, etc)

   ☐ Drop in Centre / Shelter

   ☐ Homeless

   ☐ Other

   Number of people sharing residence: ____________________________

   High risk contacts (specify): ____________________________________________

   Previously unexposed contacts:  ☐ Yes  ☐ No

   Private room:  ☐ Yes  ☐ No

   Air circulation adequate:  ☐ Yes  ☐ No  (refer to AHW Guidelines for Prevention Transmission 1998)

4. Transportation (describe):  ☐ private transportation available ____________________________

   ☐ no transportation resources ____________________________

Social Factors / Considerations

1. Support for activities of daily living (describe):

   Grocery shopping / meal preparation  ☐ Yes  ☐ No

   Laundry / housekeeping  ☐ Yes  ☐ No

   Banking / bill payment  ☐ Yes  ☐ No

   Medical appointments  ☐ Yes  ☐ No

2. Occupation / Employment status (describe): ____________________________________________

3. Family / Friends involved in care (name): ____________________________________________
4. Social Services involved / available: □ No
   □ Yes Social Worker (name)________________________ (ph. #): __________________

5. Other community support services involved / available (describe): __________________

6. Emotional / Spiritual support (describe): ________________________________________

7. Family / friends support (describe): ____________________________________________

**Individual Factors / Considerations**

Understanding of TB diagnosis / treatment plan: □ Yes □ No
Describe: ______________________________________________________________________

Acceptance of TB diagnosis / treatment plan: □ Yes □ No
Describe: ______________________________________________________________________

1. Current medication(s) (list) ____________________________________________________

2. Compliance with current medication and follow up (describe): _____________________

**Prescribed Treatment**

1. Diagnosis: ________________________________________________________________

2. Drug Resistance: □ Yes □ No

3. Current drug regimen: □ INH □ RIF □ PZA □ EMB □ Other _____________________

4. Date medication started: ____________________________

5. DOT provided by: □ Public Health Nurse □ Hospital Staff □ Other ______________

6. Location of DOT: □ Home □ Hospital □ Other _________________________________

7. Frequency of DOT: □ Daily □ 5x week □ 2x week ______________________________

8. Other medical diagnosis (list) _______________________________________________

9. Follow up appointment: TB Clinic (date) _____________________________
   Other medical appointment(s): where __________________ date ____________________

10. Bloodwork: □ Routine □ Other (specify): _________________________________

11. Vision screening: □ Routine □ Other (specify): ____________________________

**E. Summary / Plan**

____________________________________________________________________________
____________________________________________________________________________
Sample Form #2: Sample Voluntary Client Isolation Contract
(Suggested language, may place on RHA letterhead)

To: ________________________________

You have infectious TB. Infectious means that you could spread TB to other people by being in the same room or home with them. The TB germ spreads from one person to another through the air. The TB germ gets into the air when you cough, sneeze, sing or speak forcefully. To protect people around you from catching TB, you need to take your TB pills and stay at ____________________ until you can no longer spread your TB. Then you will be able to return to doing the things you normally do including visiting with other friends and family. You will need to keep taking the TB pills even after you return to your normal activity. The health staff will regularly check on you during the time you are taking pills. We will let you know when new tests need to be done and what those tests show. We will also let you know when you no longer need to take pills.

We found that you have TB from a ______________ sample which showed the TB germ under a microscope; a ______________ sample with TB germs which grew in a lab; and/or a chest x-ray done on ______________ which showed signs of TB disease in your lungs.

It is against the law for people in Alberta with infectious TB to 1) stop taking their TB pills before the health staff tell them to or 2) go out in public while they are still able to spread the TB germ to other people. These laws are part of the Public Health Act and Communicable Disease Regulations. If you break these laws you could be picked up by the police and taken to hospital to protect other people from catching your TB and to get medical care. If you follow this agreement you will not break any laws.

I understand the above. I, ____________________, agree to remain at ____________________ to protect other people from catching TB from me. I will remain there until I am told by ____________________ that I no longer need to.

While I remain at ____________________ I agree that I will only spend time with the people I live with, the TB health staff and the other people agreed to by the Regional Medical Officer of Health. These people are: ________________________________

I will call the Public Health Nurse and/or Community Health Nurse at ph. #: ____________________ if:

• I am having any problem sticking to this agreement,
• my symptoms change, and/or
• I remember anyone else who was in contact with me and should be tested for TB.

I understand that the Public Health Nurse and/or Community Health Nurse will visit me regularly. They will check on how I am doing and make sure that I am not having problems sticking to this agreement.

Signature: ____________________ Date: ____________________

Witnessed by: ____________________ Date: ____________________
PUBLIC HEALTH ACT
Section 49(2)

CERTIFICATE OF A MEDICAL OFFICER OF HEALTH

TO ALL OR ANY OF THE PEACE OFFICERS IN ALBERTA
AND TO ALL OR ANY OF THE PHYSICIANS IN ALBERTA

I, doctor’s name, of city/town Alberta, Medical Officer of Health, hereby certify that patient’s name of city/town, Alberta.

1. Is or may be infected with a disease which is a prescribed disease for the purpose of section 49 or the Public Health Act, AND

2. REFUSES or is NEGLECTING:

   (strike-inapplicable-statement)

   a) to submit to a medical examination for the purpose of ascertaining whether or not he is infected with that disease;
   b) to submit to medical, surgical or other remedial treatment that has been prescribed by a physician and that is necessary to render the person non-infectious;
   c) to complete with any other conditions that have been prescribed by a physician as being necessary to mitigate the disease or limit its spread to others.

THIS CERTIFICATE IS AUTHORITY, pursuant to section 50 of the Public Health Act,

1. for any peace officer to apprehend patient’s name and convey him to Walter C MacKenzie Centre 5C3 within 7 days of issue of this certificate.

2. for a physician to conduct an examination of patient’s name

   In the manner prescribed in the regulations under the Public Health Act AND for a physician to treat or prescribe treatment for patient’s name in order to render him non-infectious, with or without his consent, AND for a physician to detain him at WCM 5C3 in accordance with the provisions of the Public Health Act, AND

3. for a physician to prescribe any other conditions necessary to mitigate the disease or limit its spread to others.
The following precautions should be observed: (Check appropriate precaution)

☐ mask (on patient)

☐ hand washing

________________________________________
Medical Officer of Health

DATE OF ISSUE

TIME OF ISSUE __________

NOTE: Where this Certificate is issued pursuant to a Notice under section 49(1) of the Public Health Act, the Certificate must be issued within 72 hours of the date of service of that Notice.

DESCRIPTION:

NAME Patient’s name

DOB

ETHNIC ORIGIN

WEIGHT

HEIGHT

DISTINGUISHING FEATURES

CURRENT ADDRESS
Appendix 18: Screening and Prevention of Tuberculosis in HIV Patients

Recommendations For The Screening And Prevention Of Tuberculosis (TB) In Human Immunodeficiency Virus (HIV) Patients And The Screening For Human Immunodeficiency Virus In Tuberculosis Patients And Their Contacts

These recommendations were prepared by the Canadian Tuberculosis Committee. They have been approved by the Canadian Thoracic Society of the Canadian Lung Association and the Canadian Infectious Disease Society.

Screening and Prevention of Tuberculosis in Human Immunodeficiency Virus Patients

The HIV epidemic has had a dramatic impact on tuberculosis rates and tuberculosis control in populations where both infections are prevalent.\(^1\) HIV, in particular advanced HIV (AIDS), is the most potent risk factor ever identified for the progression to disease of recent or remotely acquired tuberculosis infection.\(^2\) It operates by destroying the two immune cells most important to the containment of tubercle bacilli (macrophages and CD4 receptor bearing lymphocytes).\(^3\) Amongst persons infected with Mycobacterium tuberculosis and pre-HAART (highly active antiretroviral therapy), the estimated risk of active tuberculosis relative to patients with no known risk factor is 170.0 for AIDS and 113.0 for HIV infection without AIDS.\(^2\) Cases of tuberculosis thus produced, increase the risk of transmission of M. tuberculosis within the community, thereby constituting a second, indirect mechanism by which HIV increases tuberculosis morbidity.\(^4\) In Canada, two groups in particular are at increased risk of being infected with M. tuberculosis — the foreign-born from tuberculosis endemic countries and Aboriginals.\(^5\) Recent data suggest that HIV/AIDS is increasing amongst these groups.\(^5,7\) Treatment of latent tuberculosis infection (LTBI) has been shown to reduce the risk of progression to active disease in HIV-TB co-infected individuals.\(^8,9\) It is recommended that:

1. Every newly diagnosed patient with HIV infection should be assessed for the presence of active tuberculosis at the time of diagnosis of HIV. An inquiry after symptoms that would suggest active tuberculosis (cough, especially if productive or associated with hemoptysis, fever, weight loss, night sweats) should be made and any history of past tuberculosis or known/likely exposure to tuberculosis, ascertained. In those reporting having received treatment of active tuberculosis or LTBI in the past, a determination of the adequacy of prior treatment must be made. As well a physical examination that includes examination of extrapulmonary sites of disease such as lymph nodes,\(^10\) and a chest radiograph should be performed and features of current or past tuberculosis sought. The examiner should be conscious of the fact that the clinical and radiographic features of tuberculosis may be altered in the presence of HIV infection in approximate proportion to the individual’s degree of immunosuppression.\(^5\) Persons with suspect active tuberculosis should have sputum or other appropriate specimens submitted for acid-fast bacilli (AFB) smear and culture.

2. Healthcare workers caring for patients with HIV infection should maintain a high level of suspicion for tuberculosis.

3. Except in those with a history of active tuberculosis or a well documented previous positive tuberculin skin test (TST), every HIV-infected person should have a TST with intermediate strength (5-TU) purified protein derivative by the Mantoux method and read at 48–72 hours by a healthcare worker experienced at reading TSTs.
4. Tuberculosis screening with TST should be performed as soon as possible after HIV infection is diagnosed because the reliability of the TST can diminish as the CD4 lymphocyte count declines.

5. The TST should be repeated annually in patients at increased risk of ongoing tuberculosis exposure. In those in whom repeated testing is anticipated, the initial test should be a 2–Step test.2

6. Induration of 5 mm or more on the TST should be considered indicative of tuberculous infection.2,3

7. Routine anergy testing is not recommended.11,12

8. In TST negative patients, repeat TST may be considered after institution of antiretroviral therapy and evidence of immune reconstitution.3

9. Unless specifically contraindicated, HIV-positive persons: a) who have a positive TST (≥ 5 mm of induration) b) who have not already been treated for tuberculosis infection, and c) whose test results exclude active tuberculosis should be strongly encouraged to take preventive therapy.12,15 This preventive therapy is indicated even if the date of TST conversion cannot be determined. Because of the very high risk of developing active tuberculosis in HIV-TB co-infected individuals, creative means of enhancing adherence such as directly observed preventive therapy should be considered particularly if concerns exist about the patient’s adherence.

10. HIV-infected close contacts of patients with infectious tuberculosis should receive treatment for presumptive latent tuberculosis infection, even when repeat TST after contact is not indicative of latent infection.15 Because re-infection can occur this may at times imply retreatment of a person who has already undergone treatment in the past.

11. Preventive therapy is recommended during pregnancy for HIV-infected patients who have either a positive TST or a recent history of exposure to active tuberculosis, after active tuberculosis has been excluded.

12. HIV-infected persons who are candidates for, but who do not receive tuberculosis preventive therapy, should be assessed periodically for symptoms of active tuberculosis as part of their ongoing HIV infection management. Clinicians should educate these persons about the symptoms of tuberculosis disease and advise them to seek medical attention promptly should such symptoms develop.

13. The administration of BCG vaccine to HIV-infected persons is contraindicated because of its potential to cause disseminated disease.

14. HIV-infected persons should be advised that certain activities and occupations may increase the likelihood of exposure to tuberculosis. These include volunteer work or employment in healthcare facilities, correctional institutions and shelters for the homeless, as well as travel to tuberculosis endemic countries.

Tuberculosis in an HIV-infected person is an AIDS defining illness. Both tuberculosis and AIDS should be reported to the Public Health Department.16
Patients with tuberculosis constitute an important “sentinel” population for HIV screening. In some African countries with high tuberculosis prevalence, HIV prevalence exceeds 50% amongst tuberculosis patients. In the United States, between 1985 and 1992, tuberculosis patients were 204–fold more likely to have AIDS than the general population.\textsuperscript{18} The benefits of identifying previously unrecognized HIV infection are substantial, in terms of both the opportunities for preventing future HIV transmission and the large potential benefits to the patient of antiretroviral therapy.\textsuperscript{5} Knowledge of the HIV serostatus of tuberculosis patients may also influence the treatment of their tuberculosis.\textsuperscript{19} Even in those not receiving antiretrovirals there may be an increased risk of adverse reactions from antituberculosis drugs.\textsuperscript{20} Because HIV-infected persons are at risk of peripheral neuropathy, co-administration of pyridoxine with isoniazid may be prudent. Some HIV-infected tuberculosis patients have been reported to malabsorb their antituberculosis drugs so that measurement of serum drug levels may be necessary if there is a poor response to treatment.\textsuperscript{5} It is recommended that:

1. All newly diagnosed tuberculosis patients should be strongly encouraged to undergo HIV serologic testing.

2. HIV-testing of contacts of infectious tuberculosis cases should be considered if they are at risk for HIV.\textsuperscript{21, 22}

Healthcare providers, administrators and tuberculosis controllers should strive to promote coordinated care for patients with tuberculosis and HIV and to improve information sharing between tuberculosis control programs and HIV/AIDS programs.
Acknowledgement

The authors thank Susan Falconer for her secretarial assistance.

References (for Appendix 18)

12. Slovis BS, Plitman JD, Haas DW. The case against anergy testing as routine adjunct to tuberculin skin testing. JAMA 2000;283:2003-7.