Tuberculosis

Although the overall number of tuberculosis (TB) cases in Canada is low, TB is still reported in every province and territory. To reduce TB transmission, timely diagnosis, management, and treatment of active TB disease and latent TB infection is critical. When CADTH conducted a condition-level review of the evidence and clinical practice guidelines on TB, **significant evidence gaps were uncovered**.

CADTH's condition-level review on TB has identified and assessed evidence and clinical practice guidelines on multiple interventions used in TB care — from prevention and diagnosis to treatment and management. Before undertaking this work, CADTH asked TB decision-makers from across the country for input to guide our evidence reviews. Our condition-level review reflects Canadian decision-makers' needs for evidence to support their TB-related decisions.

The process of conducting this condition-level review uncovered significant evidence gaps. That is, in many cases the research is lacking, dated, and/or limited. Because these gaps in the evidence may be important to TB decision-makers, we have captured them in this document. We also hope that this information will help inform and support future research. To access all CADTH's evidence reviews on topics related to TB, visit tuberculosis.cadth.ca.

CADTH's condition-level review was completed in 2021. The information included in this document reflects evidence gaps we identified, up until that time, while conducting reviews through our Rapid Review service and Reference List service. We acknowledge that new research might have become available since then. In addition, there may be evidence that we did not include, because of the searching and screening methods we used. We encourage users to consult the appendices of the CADTH reports cited in this document as they might provide useful information for some decisions.

Overview

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Prevention

Home or Community Isolation

Social distancing measures are essential components of a public health response to airborne infectious diseases, including influenza, COVID-19, and TB.

Evidence Decision-Makers Requested

- Information about the clinical effectiveness of home or community isolation for preventing TB transmission.
- Evidence-based guidelines on home or community isolation for preventing TB transmission.

What We Found

- One evidence-based guideline recommended that individuals in prisons or immigration removal centres, who have undergone an X-ray for suspected active TB, be isolated in a ventilated room or cell (The National Institute of Health and Care Excellence, 2016).
- Four evidence-based guidelines (1 Canadian and 3 international) that included recommendations regarding isolation were also identified in this CADTH report.

What We Didn't Find

Even though clinical practice guidelines recommend home or community isolation of people diagnosed with active TB, CADTH did not identify research evidence assessing the clinical effectiveness of these isolation measures for preventing TB transmission or infection.

Evidence Gaps

Research on the clinical effectiveness of home or community isolation.

Resulting CADTH Report

Isolation Measures to Prevent Tuberculosis Transmission: Clinical Effectiveness and Guidelines (2020)

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Prevention

Sharing Smoking Devices

Sharing of smoking devices, such as cannabis water pipes, is a suspected source of TB transmission.

Evidence Decision-Makers Requested

Clinical evidence on the role of shared smoking devices in the transmission of TB.

What We Found

Not applicable.

What We Didn't Find

Even though sharing smoking devices is noted as a common practice among individuals at risk of TB exposure, CADTH did not identify research evidence assessing the role of sharing smoking devices in TB transmission.

Evidence Gap

Research on understanding the role of sharing smoking devices in TB transmission.

Resulting CADTH Report

Shared Smoking Devices and the Transmission of Tuberculosis: Clinical Evidence (2020)

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Prevention

Vitamin D Supplementation

It is thought that vitamin D supplementation might help reduce the risk of TB infection.

Evidence Decision-Makers Requested

- Clinical effectiveness of vitamin D supplementation for preventing TB infection.
- Evidence-based guidelines on the use of vitamin D supplementation for preventing TB infection.

What We Found

One systematic review that evaluated the clinical effectiveness of vitamin D in the prevention of TB and other infectious diseases in children younger than 5.

What We Didn't Find

Even though there is interest in guidance for using vitamin D supplementation to support the prevention of TB, CADTH did not identify evidence-based guidelines with relevant recommendations.

Evidence Gap

Evidence-based guidelines with relevant recommendations.

Resulting CADTH Report

Vitamin D Supplementation for the Prevention of Tuberculosis Infection: Clinical Effectiveness and Guidelines (2020)

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Identification

Xpert MTB/RIF Testing

The Xpert MTB/RIF test is a Health Canada–approved rapid diagnostic test for pulmonary TB. It uses polymerase chain reaction–based nucleic acid amplification to detect M. tuberculosis and rifampicin resistance. Because the test is automated and the results are rapidly available (within 2 hours), Xpert testing can be useful in settings with resource constraints where the infection rates are high.

Evidence Decision-Makers Requested

Cost-effectiveness of rapid and simultaneous TB and antibiotic susceptibility testing for the detection of pulmonary TB or rifampicin resistance.

What We Found

- Six economic evaluations (5 cost-effectiveness analyses and 1 cost-utility analysis) comparing the cost-effectiveness of Xpert MTB/RIF testing compared with smear microscopy.
- Evidence on the diagnostic accuracy of rapid and simultaneous tuberculosis and antibiotic susceptibility testing for the diagnosis of pulmonary tuberculosis and rifampicin resistance (CADTH Report, 2020).

What We Didn't Find

Even though evidence suggests that rapid molecular testing such as Xpert MTB/RIF testing could be a cost-effective alternative to sputum smear microscopy, CADTH did not identify economic evaluations of this test compared with mycobacterial cultures or culture-based susceptibility testing.

Evidence Gaps

Economic evaluations to assess the cost-effectiveness of the Xpert MTB/RIF test compared with mycobacterial cultures or culture-based susceptibility testing.

Resulting CADTH Report

Rapid Testing for the Diagnosis of Pulmonary Tuberculosis and Rifampicin Resistance: A Review of Cost-Effectiveness (2021)

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Identification

Interferon Gamma Release Assay for Managing Latent TB Infection in Rural and Remote Settings

Interferon Gamma Release Assay (IGRA) appears to be more accurate than Tuberculin skin tests (TST) for identifying latent TB Infection (LTBI) in some populations (e.g., those vaccinated with Bacille Calmette-Guérin [BCG]). However, it is not always available, particularly in rural and remote communities, because of infrastructure challenges for transporting the blood.

Evidence Decision-Makers Requested

- Usefulness of IGRA for identifying LTBI in rural and remote settings.
- Cost-effectiveness of the IGRA for identifying LTBI in rural and remote settings.
- Evidence-based guidelines regarding the identification of LTBI in rural and remote settings.

What We Found

One systematic review that compared the accuracy of IGRA with TST in high-risk pediatric Indigenous populations in Canada.

What We Didn't Find

Even though IGRA could be used in rural and remote settings, CADTH did not identify research evidence assessing the role of using IGRA for managing LTBI in people living in these settings. Similarly, CADTH did not identify economic evaluations or evidence-based guidelines related to using IGRA in rural and remote settings.

Evidence Gaps

- Research on the role of using IGRA in rural and remote settings.
- Economic evaluations to assess the cost-effectiveness of using IGRA in rural and remote settings.
- Evidence-based guidelines with relevant recommendations.

Resulting CADTH Report

Interferon Gamma Release Assay for the Identification of Latent Tuberculosis Infection in Rural and Remote Settings (2021)

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Identification

Identifying LTBI in People Who Have Been Vaccinated With BCG

In people who have been vaccinated with BCG, IGRA appears to be related to fewer diagnoses for LTBI infection, fewer prescriptions to prevent TB, and no difference in the number of active TB cases compared to TST testing (findings based on 1 [non-randomized study] of low quality).

Evidence Decision-Makers Requested

- Usefulness of IGRA for identifying LTBI in people with previous BCG vaccination.
- Cost-effectiveness of IGRA for identifying LTBI in people with previous BCG vaccination.
- Evidence-based guidelines regarding the identification of LTBI in people with previous BCG vaccination.

What We Found

- One non-randomized study of low quality that reported on LTBI diagnosis, prescription of TB therapy, and development of active TB when using IGRA in people who have been vaccinated with BCG.
- One evidence-based guideline recommending that either a TST or IGRA should be used to identify LTBI, with BCG vaccination not being a determining factor in selecting a test (World Health Organization, 2018).

What We Didn't Find

Even though there are differences regarding the cost, ease of use, skill, and laboratory equipment required for these 2 tests, CADTH did not identify any economic evaluations on the cost-effectiveness of using IGRA to identify LTBI in people with previous BCG vaccination.

Evidence Gaps

Economic evaluations to assess the cost-effectiveness of using IGRA for LTBI identification in people with previous BCG vaccination.

Resulting CADTH Reports

Interferon Gamma Release Assay for Identifying Latent Tuberculosis Infection in People With Bacillus Calmette-Guérin Vaccination (2021)

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Interferon Gamma Release Assay for the Identification of Latent Tuberculosis Infection in People with Previous Bacille Calmette-Guérin Vaccination: Clinical Utility, Cost-Effectiveness, and Guidelines (2020)

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Identification

LTBI Screening of Students in Post-Secondary Programs

The prevalence of LTBI has been found to be high among students in post-secondary programs where there is high risk of exposure to TB (e.g., students undergoing clinical training). Moreover, TB is a frequent cause of hospitalization among migrants coming from areas where the incidence of TB is high.

Evidence Decision-Makers Requested

- Clinical utility of baseline testing for LTBI in students in programs with a risk of exposure to TB.
- Cost-effectiveness of baseline testing for LTBI in students in programs with a risk of exposure to TB.
- Evidence-based guidelines regarding the testing for LTBI in students in programs with a risk of exposure to TB.

What We Found

Not applicable.

What We Didn't Find

Although the risk for LTBI might be high among students in post-secondary programs where there is a risk of TB exposure, CADTH did not identify research on the clinical utility, cost-effectiveness, or evidence-based guidelines for using LTBI screening before admission in the program, or before starting the practical placement.

Evidence Gaps

- Research on the clinical utility of LTBI screening for students.
- Economic evaluations to assess the cost-effectiveness of LTBI screening for students.
- Evidence-based guidelines with relevant recommendations.

Resulting CADTH Report

Screening for Latent Tuberculosis Infection in Post-Secondary Institutions: Clinical Utility, Cost-Effectiveness, and Guidelines (2020)

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Identification

LTBI Screening to Reduce the Risk of TB Reactivation

Treating LTBI can prevent the development of active TB and is an important component of TB control. There is a need for a better understanding of measures that can prevent TB reactivation.

Evidence Decision-Makers Requested

- Clinical utility of screening for LTBI in people at risk of TB reactivation.
- Clinical utility of treating LTBI to prevent TB reactivation.
- Evidence-based guidelines for the prevention of TB reactivation.

What We Found

- One network meta-analysis and one non-randomized study regarding the clinical effectiveness of treating LTBI to prevent TB reactivation.
- Two evidence-based guidelines regarding the prevention of TB reactivation (NICE, 2016; U.S. Preventive Services Task Force, 2016).

What We Didn't Find

Even though screening for LTBI could lead to the identification of cases that qualify for treatment, CADTH did not identify research on the use or effectiveness of LTBI screening for reducing the risk of TB reactivation among people at risk.

Evidence Gaps

Research on the use or effectiveness of LTBI screening for reducing the risk of TB reactivation among people at risk.

Resulting CADTH Report

Prevention of Tuberculosis Reactivation (2021)

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Identification

Chest X-Rays for Assessing Adults for TB Before They Move Into Long-Term Care Facilities

It is recommended that chest X-rays are part of a TB assessment in people from certain higher risk groups before they move into long-term care.[1]

Evidence Decision-Makers Requested

- Usefulness of chest X-rays for assessing adults for illness before they move into long-term care facilities (e.g., to prevent infection of other patients, control infection).
- Evidence-based guidelines for assessing adults for illness before they move into long-term care facilities.

What We Found

Not applicable.

What We Didn't Find

Even though chest X-rays are used for TB screening before admission to a long-term care facility, CADTH did not identify research evidence on the effectiveness of chest X-rays for assessing adults for TB before they move into long-term care facilities. In addition, CADTH did not find any evidence-based guidelines for assessing individuals for illness before they move into long-term care facilities.

Evidence Gaps

- Research evidence on the effectiveness of chest X-rays for assessing adults for TB before they move into long-term care facilities.
- Evidence-based guidelines with relevant recommendations.

Resulting CADTH Report

Chest X-Rays Prior to Placement in Long-Term Care Facilities: Clinical Utility and Guidelines (2020)

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[1] Refer to TB Standards (8th edition) for this note.

Treatment

Drug Substitution in the Treatment of TB When There is a Shortage of, or Intolerance to, First-Line Treatment

Globally, factors such as the improper prescription of TB drugs, unavailability, or malabsorption of these drugs has increased the prevalence of drug-resistant TB.

Evidence Decision-Makers Requested

- Evidence-based guidelines for the therapeutic substitution of different drugs for treating TB when there is a shortage of, or limited access to, the first-line treatment.
- Evidence-based guidelines for the therapeutic substitution of different drugs for treating TB when there is an intolerance of the first-line treatment.
- Evidence-based guidelines for the therapeutic substitution of different drugs for the treatment of TB when there is resistance to one of the drugs in the first-line treatment.

Resulting CADTH Report

Therapeutic Substitution of Drugs for the Treatment of Tuberculosis: Guidelines (2020)

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What We Found

Three evidence-based guidelines regarding the therapeutic substitution of different drugs for the treatment of TB when there is resistance to one of the drugs in the first-line treatment (American Thoracic Society, 2019; World Health Organization, 2019; Public Health Agency of Canada, 2014). All 3 guidelines recommend drug substitutions in the case of single drug resistance to isoniazid.

What We Didn't Find

Evidence-based guidelines for substituting different drugs for the treatment of TB when there is a shortage of, or intolerance to, the first-line treatment.

Evidence Gaps

Evidence-based guidelines with relevant recommendations.

Management

Managing Active TB or LTBI in People Who Stop Their Treatments Early

In some cases, individuals with LTBI may refuse treatment or choose to discontinue treatment before its completion. Similarly, individuals with active TB in some cases may not adhere to the prescribed treatment.

Evidence Decision-Makers Requested

- Evidence-based guidelines for treating people with LTBI who discontinue their treatment before completion.
- Evidence-based guidelines for the treatment of people with active TB who discontinue their treatment before completion.

What We Found

Not applicable.

What We Didn't Find

Even though, clinical providers are encouraged to make every effort to support continuation of treatment in the affected individuals, CADTH did not identify any evidence-based guidelines on managing active TB or LTBI in people who stop treatments early.

Evidence Gaps

Evidence-based guidelines with relevant recommendations.

Resulting CADTH Report

Management of Discontinued Treatment for Tuberculosis: Guidelines (2020)

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Management

Portable or Temporary Negative Pressure Rooms for Managing TB

Isolation rooms with negative pressure (air cannot escape to the other parts of the facility when the door is closed) are used to prevent the spread of TB from an infected individual. Portable or temporary negative pressure rooms could also be created by converting a hospital room using filtration equipment, using standalone equipment that surrounds the patient, installing temporary negative pressure rooms, or using units outside of the hospital.

Evidence Decision-Makers Requested

- Clinical effectiveness of portable or temporary negative pressure rooms for the management of active TB.
- Evidence-based guidelines for the use of portable or temporary negative pressure rooms for the management of active TB.

What We Found

Not applicable.

What We Didn't Find

Even though these temporary options are considered for airborne infectious disease management in cases of increased need such as an outbreak with large numbers of communicable patients in a hospital setting, CADTH did not identify research evidence assessing the clinical effectiveness of portable or temporary negative pressure rooms for managing active TB. In addition, CADTH did not identify evidence-based guidelines for using portable or temporary negative pressure rooms in active TB management.

Evidence Gaps

- Research evidence assessing the clinical effectiveness of portable or temporary negative pressure rooms for managing active TB.
- Evidence-based guidelines with relevant recommendations.

Resulting CADTH Report

Portable or Temporary Negative Pressure Rooms for Tuberculosis: Clinical Effectiveness and Guidelines (2020)

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CADTH offers a range of evidence products and services to meet the needs of decision-makers. These products include reimbursement reviews, health technology reviews, reference lists, horizon scans, and other tailored programs and services. We remain open to creating the products and services that will best meet decision-makers' needs.

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requests@cadth.ca