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CADTH RAPID RESPONSE REPORT: REFERENCE LIST

Interventions for the Diagnosis of Tuberculosis: Clinical Effectiveness and Guidelines

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About CADTH: CADTH is an independent, not-for-profit organization responsible for providing Canada's health care decision-makers with objective evidence to help make informed decisions about the optimal use of drugs, medical devices, diagnostics, and procedures in our health care system.

Funding: CADTH receives funding from Canada's federal, provincial, and territorial governments, with the exception of Quebec.

Research Questions

1. What is the clinical effectiveness of interventions used for the diagnosis of tuberculosis?
2. What are the evidence-based guidelines regarding the diagnosis of tuberculosis?

Key Findings

One health technology assessment and fourteen systematic reviews (twelve with meta-analysis) were identified regarding the clinical effectiveness of interventions used to diagnose tuberculosis. In addition, seven evidence-based guidelines were identified regarding the diagnosis of tuberculosis.

Methods

A limited literature search was conducted by an information specialist on key resources including MEDLINE All (1946–) via Ovid, the Cochrane Library, the University of York Centre for Reviews and Dissemination (CRD) databases, the websites of Canadian and major international health technology agencies, as well as a focused Internet search. The search strategy was comprised of both controlled vocabulary, such as the National Library of Medicine's MeSH (Medical Subject Headings), and keywords. The main search concepts were diagnosis, thoracic radiography, x-ray computed tomography, interferon-gamma release tests, nucleic acid amplification techniques, skin tests, sputum cultures, rapid diagnostic tests and tuberculosis. Search filters were applied to limit retrieval to health technology assessments, systematic reviews, meta-analyses, or network meta-analyses, and guidelines. Where possible, retrieval was limited to the human population. The search was also limited to English language documents published between January 01, 2014 and June 25, 2019. Internet links were provided, where available.

Selection Criteria

One reviewer screened citations and selected studies based on the inclusion criteria presented in Table 1.

Table 1: Selection Criteria

Population	Any individual suspected of having tuberculosis
Intervention	Any intervention used to diagnose tuberculosis
Comparator	Q1: Any other intervention used to diagnose tuberculosis Q2: No comparator
Outcomes	Q1: Clinical effectiveness, safety Q2: Evidence-based guidelines
Study Designs	Health technology assessments, systematic reviews, meta-analyses, evidence-based guidelines

Results

Rapid Response reports are organized so that the higher quality evidence is presented first. Therefore, health technology assessment reports, systematic reviews, and meta-analyses are presented first. These are followed by evidence-based guidelines.

One health technology assessment and fourteen systematic reviews (twelve with meta-analysis) were identified regarding the clinical effectiveness of interventions used to diagnose tuberculosis. In addition, seven evidence-based guidelines were identified regarding the diagnosis of tuberculosis.

Additional references of potential interest are provided in the appendix.

Health Technology Assessments

1. Auguste P, Tsertsvadze A, Pink J, et al. Accurate diagnosis of latent tuberculosis in children, people who are immunocompromised or at risk from immunosuppression and recent arrivals from countries with a high incidence of tuberculosis: systematic review and economic evaluation. *Health Technol Assess.* 2016;20(38). https://www.journalslibrary.nihr.ac.uk/hta/hta20380/#/abstract. Accessed 2019 Jul 02.

Systematic Reviews and Meta-analyses

2. Agizew T, Boyd R, Auld AF, et al. Treatment outcomes, diagnostic and therapeutic impact: Xpert vs. smear. A systematic review and meta-analysis. *Int J Tuberc Lung Dis*. 2019 01 01;23(1):82-92.
PubMed: PM30674379

3. Di Tanna GL, Khaki AR, Theron G, et al. Effect of Xpert MTB/RIF on clinical outcomes in routine care settings: individual patient data meta-analysis. *Lancet Glob Health*. 2019 Feb;7(2):e191-e199.
PubMed: PM30683238

4. Auguste P, Tsertsvadze A, Pink J, et al. Comparing interferon-gamma release assays with tuberculin skin test for identifying latent tuberculosis infection that progresses to active tuberculosis: systematic review and meta-analysis. *BMC Infect Dis*. 2017 03 09;17(1):200.
PubMed: PM28274215

5. Datta S, Shah L, Gilman RH, Evans CA. Comparison of sputum collection methods for tuberculosis diagnosis: a systematic review and pairwise and network meta-analysis. *Lancet Glob Health*. 2017 08;5(8):e760-e771.
PubMed: PM28625793

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PubMed: PM26493775

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PubMed: PM25579159

Subpopulation – Children

9. Ioos V, Cordel H, Bonnet M. Alternative sputum collection methods for diagnosis of childhood intrathoracic tuberculosis: a systematic literature review. *Arch Dis Child*. 2019 Jul;104(7):629-635.
PubMed: PM30127061

10. Meier NR, Volken T, Geiger M, Heininger U, Tebruegge M, Ritz N. Risk factors for indeterminate interferon-gamma release assay for the diagnosis of tuberculosis in children-a systematic review and meta-analysis. *Front*. 2019;7:208.
PubMed: PM31192175

Subpopulation – Immunocompromised Patients

11. Myint TM, Rogerson TE, Noble K, Craig JC, Webster AC. Tests for latent tuberculosis in candidates for solid organ transplantation: a systematic review and meta-analysis. *Clin Transplant*. 2019 Jun 21:e13643.
PubMed: PM31225918

12. Overton K, Varma R, Post JJ. Comparison of interferon-gamma release assays and the tuberculin skin test for diagnosis of tuberculosis in human immunodeficiency virus: a systematic review. *Tuberc Respir Dis (Seoul)*. 2018 Jan;81(1):59-72.
PubMed: PM29256218

13. Ayubi E, Doosti-Irani A, Sanjari Moghaddam A, et al. Comparison of QuantiFERON-TB Gold In-Tube (QFT-GIT) and tuberculin skin test (TST) for diagnosis of latent tuberculosis in haemodialysis (HD) patients: a meta-analysis of kappa estimates. *Epidemiol Infect*. 2017 07;145(9):1824-1833.
PubMed: PM28249638

14. Ayubi E, Doosti-Irani A, Sanjari Moghaddam A, Sani M, Nazarzadeh M, Mostafavi E. The clinical usefulness of tuberculin skin test versus interferon-gamma release assays for diagnosis of latent tuberculosis in HIV patients: a meta-analysis. *PLoS One*. 2016;11(9):e0161983.
PubMed: PM27622293

15. Ruan Q, Zhang S, Ai J, Shao L, Zhang W. Screening of latent tuberculosis infection by interferon-gamma release assays in rheumatic patients: a systemic review and meta-analysis. *Clin Rheumatol*. 2016 Feb;35(2):417-425. PubMed: PM25376466

Guidelines and Recommendations

16. Lee SH, Yeo Y, Kim TH, et al. Korean guidelines for diagnosis and management of interstitial lung diseases: part 2. Idiopathic pulmonary fibrosis. *Tuberc Respir Dis (Seoul)*. 2019 Apr;82(2):102-117. PubMed: PM30841014

17. Hauk L. Tuberculosis: guidelines for diagnosis from the ATS, IDSA, and CDC. *Am Fam Physician.* 2018 Jan 01;97(1):56-58. https://www.aafp.org/afp/2018/0101/p56.pdf. Accessed 2019 Jul 02.

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19. National Institute for Health and Care Excellence. Tuberculosis. *(NICE guideline NG33)* 3016; https://www.nice.org.uk/guidance/ng33. Accessed 2019 Jul 02.
See: Recommendations 1.2 to 1.4

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21. Centre for Communicable Diseases and Infection Control. Canadian tuberculosis standards 7th edition: 2014. Ottawa (ON): Public Health Agency of Canada (PHAC); 2014: https://www.canada.ca/en/public-health/services/infectious-diseases/canadian-tuberculosis-standards-7th-edition.html. Accessed 2019 Jul 02.
See: Chapters 3 and 4

22. World Health Organization. Guidance for national tuberculosis programmes on the management of tuberculosis in children. Second edition. Geneva (CH): WHO; 2014: https://apps.who.int/iris/bitstream/handle/10665/112360/9789241548748_eng.pdf;jsessionid=3EFEF6919A663F50F1B886AF2BF02FA3?sequence=1. Accessed 2019 Jul 02.
See: Sections 3, 6.3, and 7.3

Appendix — Further Information

Systematic Reviews and Meta-analyses

Alternative Outcomes

23. Mhimbira FA, Cuevas LE, Dacombe R, Mkopi A, Sinclair D. Interventions to increase tuberculosis case detection at primary healthcare or community-level services. *Cochrane Database Syst Rev*. 2017 11 28;11:CD011432. PubMed: PM29182800

Guidelines and Recommendations – Methodology Not Specified

24. Subramanian AK, Theodoropoulos NM, Infectious Diseases Community of Practice of the American Society of Transplantation. Mycobacterium tuberculosis infections in solid organ transplantation: guidelines from the infectious diseases community of practice of the American Society of Transplantation. *Clin Transplant*. 2019 Feb 28:e13513. PubMed: PM30817030

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Review Articles

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See: Sections 3 to 7