

**Title: Commercial serological tests for pulmonary and extrapulmonary TB, an update**

This *systematic review* presents *evidence* from a collection of studies evaluating tests or strategies for the diagnosis of tuberculosis (TB). Terms in *italics* are defined in the TB Evidence Glossary.

**Why this review is important:** Serological tests are used for many diseases, including HIV. ‘Serological tests’ in this paper refer to blood tests that detect antibody responses to *Mycobacterium tuberculosis* antigens for diagnosis of active TB and should not be confused with interferon-gamma release assays (IGRAs), blood tests used primarily for detection of latent TB infection. In comparison with microscopy, serological tests offer the advantages of rapid results and simple technique, important qualities for a point-of-care test. Also, in children and extrapulmonary cases, where sputum is difficult to obtain, a blood test may be more practical. Based on previous systematic reviews and a laboratory evaluation, commercial serological tests for TB have been found to be inaccurate and *inconsistent*. In fact, the International Standards for TB Care discourages the use of these tests. Despite the evidence, commercial serological tests for TB are in widespread use in high TB burden countries.

**Objective:** to summarize new evidence since 2006 concerning the accuracy of commercial serological tests for the diagnosis of pulmonary and extrapulmonary TB. To combine results from individual studies in a *meta-analysis* to obtain summary (pooled) estimates for *sensitivity* and *specificity*.

**Main findings:** Approximately 50% of the studies were performed in low- and middle-income countries. For pulmonary TB, 67 studies involving 5147 participants were included in the review. For all tests, estimates were variable for sensitivity (0% to 100%) and specificity (31% to 100%). For anti-TB IgG, the only serological test with enough studies for meta-analysis, pooled sensitivity was 76% (95% CI 63,87) in smear-positive (7 studies) and 59% (95% CI 10,96) in smear-negative (4 studies) patients. For extrapulmonary TB, 25 studies (1809 participants) were included. For all tests, estimates were variable for sensitivity (0% to 100%) and specificity (59% to 100%).

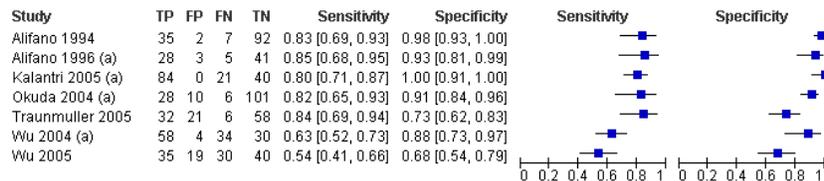


Figure. Forest plots of sensitivity and specificity, pulmonary TB, studies of smear-positive patients. TP = True Positive; FP = False Positive; FN = False Negative; TN = True Negative; 95% confidence intervals (CI) are in brackets. Sensitivity and specificity estimates for individual studies are the blue squares and 95% CIs are the horizontal black lines.

**Authors’ conclusions:** Currently available commercial serological tests for TB are inaccurate and inconsistent.

**Policy implications:** In 2010, the WHO Strategic and Technical Advisory Group on TB (STAG-TB), the highest policy making body for TB at WHO, issued a negative recommendation against the use of currently available serological tests while stressing the importance of continued research on serological and point-of-care tests.

**Comments:** The quality of the body of evidence for accuracy of commercial serologic tests for the diagnosis of pulmonary and extrapulmonary TB was summarized with the *GRADE approach* and judged to be very low.

**Systematic review:** Steingart KR et al. Commercial serological tests for the diagnosis of active pulmonary and extrapulmonary tuberculosis: An updated systematic review and meta-analysis. PLoS Medicine 2011, in press.

**Publications and other resources of related interest**

1. Steingart KR et al. Commercial serological antibody detection tests for the diagnosis of pulmonary tuberculosis: a systematic review. PLoS Med. 2007 Jun;4(6):e202.
2. Steingart et al. A systematic review of commercial serological antibody detection tests for the diagnosis of extrapulmonary tuberculosis. Thorax. 2007 Oct;62(10):911-8.
3. World Health Organization on behalf of the Special Programme for Research and Training in Tropical Diseases. Laboratory-based evaluation of 19 commercially available rapid diagnostic tests for tuberculosis. 2008

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