

Network meta-analysis methods for ranking the accuracy of multiple diagnostic tests

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Background: The diagnosis of a clinical condition is usually the first and more crucial step before initiating treatment. Diagnostic tests are routinely used for confirming or excluding a target condition. Although most diagnostic test accuracy (DTA) studies have focused on assessing a single index test, increasingly studies and systematic reviews are comparing the accuracy of multiple index tests to facilitate the selection of the best performing test(s) for patient care. For example, HPV DNA, HPV mRNA, and co-testing (Pap test + HPV DNA or mRNA test) can be used for cervical cancer diagnosis. But which test is the best? Since studies that directly compare test accuracy are not always available and comparisons between multiple tests constitute a network, DTA network meta-analysis (DTA-NMA) has been proposed.

Aims: To identify and assess DTA-NMA methods for comparing the accuracy of multiple diagnostic tests.

Methods: We conducted a methodological review of statistical and empirical studies that performed, described, or evaluated a DTA-NMA of at least 3 diagnostic tests. We searched PubMed, JSTOR, and Web of Science. Studies of any design published in English were eligible for inclusion. We also included relevant unpublished material.

Results: We included 38 relevant studies. The results will be presented at the Symposium. In particular, we will present the approaches that have been proposed together with a critique of their strengths and limitations. In addition, using cervical cancer as a case study, we will present an application of DTA-NMA methods to determine the most promising test (in terms of sensitivity and specificity) for use as the primary screening test for cervical cancer and to identify which women need referral for colposcopy.

Conclusions: Statistical approaches for comparative DTA meta-analysis of multiple tests differ and may influence interpretation and decision-making.

Keywords

network meta-analysis; diagnostic test; accuracy; indirect comparison