Research Brief

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Rapid antigen-based and rapid molecular tests for the detection of SARS-CoV-2: a rapid review with network meta-analysis of diagnostic test accuracy studies

Summary

We conducted a rapid review and diagnostic test accuracy network meta-analysis (DTA-NMA) to examine the diagnostic performance of rapid antigen and rapid molecular tests used to detect severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection amidst the global pandemic. We identified 93 studies reporting 36 rapid antigen tests involving 104,961 participants and 23 rapid molecular tests with 10,449 participants. Results showed that rapid molecular tests were more accurate, with higher sensitivity and specificity, than rapid antigen tests. Rapid antigen tests were associated with high specificity.

Implications

Results must be interpreted with caution as they were based on a rapid review, and due to time constraints, it was limited to English, peer-reviewed published studies of commercial tests, with no study risk of bias assessment. Further research, including a systematic review with an evaluation of variants, vaccinations status, participant age and test operator is required to confirm these results.

Reference: Veroniki AA, Tricco AC, Watt J, et al. Rapid antigen-based and rapid molecular tests for the detection of SARS-CoV-2: a rapid review with network meta-analysis of diagnostic test accuracy studies. BMC Med. 2023 Mar 29;21 (1):110.

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What is the current situation?

- During the COVID-19 pandemic, rapid tests yielding results in less than 1 hour were widely used.
- Incorrect SARS-CoV-2 test results can lead to unnecessary testing, isolation and distress.
- The polymerase chain reaction (PCR) reference standard test is limited in availability due to cost and capacity challenges.
- The diagnostic comparative performance of rapid molecular and antigen tests is unclear.

What is the objective?

- To determine the most sensitive and specific rapid test for the diagnosis of SARS-CoV-2.

How was the review conducted?

- We conducted a rapid review with DTA-NMA and searched EMBASE, MEDLINE and EBM Reviews-Cochrane Central Register of Controlled Trials until September 2021 for randomized controlled trials (RCTs) and cohort studies published in English.
- We included studies with available data for analysis assessing rapid antigen and/or rapid molecular test(s) to detect SARS-CoV-2 in participants of any age, suspected or not with SARS-CoV-2 infection and regardless of vaccination status. PCR was considered as a reference standard.

What did the review find?

- After screening 4,565 citations we included 314 studies. Of these 93 were RCTs or cohort studies with available data for analysis.
- In total, 68 studies assessed rapid antigen tests, 27 examined rapid molecular tests, and 2 assessed both types of tests.
- DTA-NMA suggested rapid molecular tests were associated with high sensitivity and specificity and rapid tests were associated with high specificity.
- Rapid antigen test sensitivity was higher with nasal or combined samples and lower with nasopharyngeal and asymptomatic patient samples at the time of testing.
- Two rapid molecular tests (Xpert Xpress by Cepheid and Novodiag COVID-19 by Mobidiag) and two rapid antigen tests (COVID-VIRO by AAZ-LMB and Sofia SARS Antigen FIA by Quidel) met the minimum performance criteria by World Health Organization and Health Canada.

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