



## Meta-analysis of different antibody tests to detect SARS-CoV-2 infection

Journal Article, Meta-analysis

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Kontou P, Braliou GG, Dimou NL, et al. Antibody tests in detecting SARS-CoV-2 infection: a meta-analysis. *Diagnostics* 2020 doi: 10.3390/diagnostics10050319

### Summary

#### Methods:

- Authors conducted systematic review and meta-analysis using PRISMA guidelines
- Databases used: Pubmed, medRxiv and bioRxiv
- Articles in English and Chinese, search concluded by April 17, 2020
- Criteria for eligible studies
  - Cases confirmed by NAT or by NAT and clinical findings
  - Measurement of IgM and/IgG antibodies against S and/or N viral proteins by any of available methods namely ELISA, chemiluminescence (CLIA), fluorescence immunoassay (FIA) or point-of-care lateral flow immunoassay (LFIA) based on immunochromatography
- Bivariate method for meta-analysis of diagnostic tests pooling sensitivities and specificities done.

#### Results:

- Search revealed total 115 articles from Pubmed, 72 from medRxiv and 12 from bioRxiv
- 38 eligible studies after scrutiny; total 7848 individuals (3522 COVID-19 and 4326 healthy or non COVID-19)
- ELISA: 14 studies, S-based ELISAs better than N antigen. Combination of IgG and IgM seem to be superior with sensitivity of 0.935. All ELISA based methods had high specificities 0.961-0.995
- CLIA: 13 studies. Sensitivities of IgG better than IgM 0.944 v/s 0.810, but combining both resulted in slightly worse sensitivity. Specificity of 0.954-0.984.
- LFIA: 13 studies. Combining IgM and IgM yielded sensitivity 0.78-0.83. Specificity 0.914-0.994.
- FIA: 3 studies. Sensitivity of 0.86 and specificity of 0.95
- In all the test methods mean number of days from disease onset and the proportion of severe patients influence the sensitivity of IgG tests

#### Conclusion

- ELISA based tests have higher sensitivity and specificity compared to the other methods
- CLIA based tests show comparable sensitivity but low specificity
- LFIA based tests have low sensitivity but high specificity.

#### **Appraisal:**

- Strength: Moderately large sample size
- Weakness: Since there are several kits made by different manufacturers worldwide, the applicability of this meta-analysis to a given population not clear

#### **Opinion:**

The correct method of testing for COVID-19 antibodies is important in the current phase of the pandemic when gradual re-opening of the workplace is being contemplated. In India, rapid antibody tests were introduced early in the epidemic and then withdrawn due to inaccurate results. ELISA based tests, which are most accurate of all the prevalent methods, have now a useful role to play especially to assess usefulness of convalescent plasma and the immunity status of individuals returning to work. LFIA based tests can be done as point-of-care and hence good for conducting large seroprevalence studies to assess herd immunity.



# COVID-19: Making sense of the literature

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## **Appraisers**

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