At-home COVID-19 testing: A rapid scoping review

Feb 12, 2021

Research Objectives

To summarize the available evidence on:

- how at-home testing* for COVID-19 has been implemented internationally.

- how at-home testing may fit into a broader COVID-19 test-trace-isolate strategy across jurisdictions.

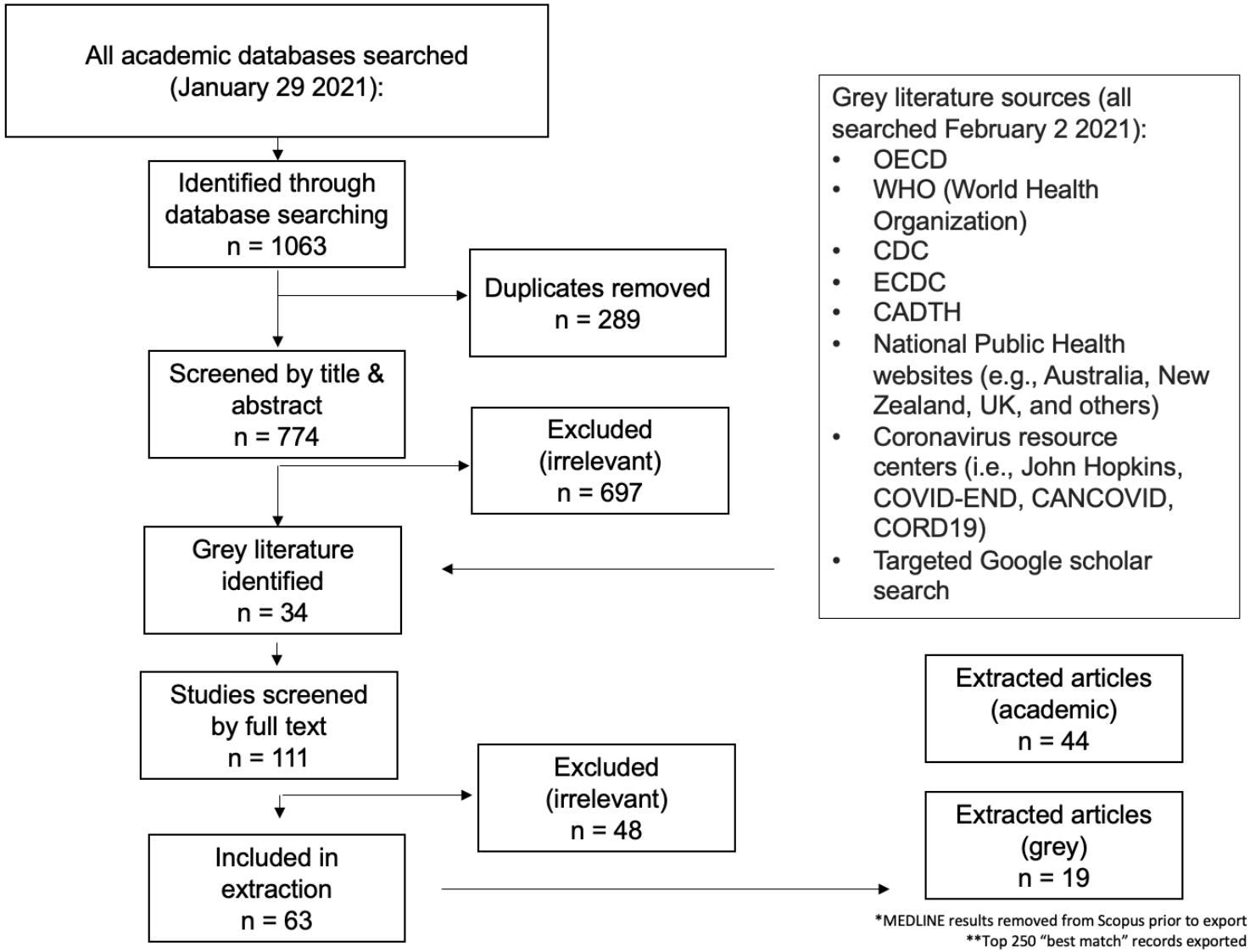
This rapid research synthesis was conducted between Jan 29, 2021 and Feb 12 2021.

*At-home testing refers to sampling which an individual without training may conduct. The result of said testing may be available immediately or require shipment to a laboratory for processing.

Methods

- A comprehensive literature search was conducted by an information specialist on Jan 29, 2021 to retrieve studies published from January 1, 2019 until search date
- Databases searched: MEDLINE, Scopus, medRxiv, and the Cochrane Database of Systematic Reviews
- A targeted grey literature search was also conducted to identify media, technical reports and white papers
  - i.e., OECD, WHO, UN, CAN-COVID, COVID-END
  - Advanced Google Search

Results


All academic databases searched (January 29 2021):
Identified through database searching n = 1063
Duplicates removed n = 289
Screened by title & abstract n = 774
Excluded (irrelevant) n = 697
Grey literature identified n = 34
Studies screened by full text n = 111
Excluded (irrelevant) n = 48
Included in extraction n = 63
Grey literature sources (all searched February 2 2021):
• OECD
• WHO (World Health Organization)
• CDC
• ECDC
• CADTH
• National Public Health websites (e.g., Australia, New Zealand, UK, and others)
• Coronavirus resource centers (i.e., John Hopkins, COVID-END, CANCOVID, CORD19)
• Targeted Google scholar search
Extracted articles (academic) n = 44
Extracted articles (grey) n = 19
*MEDLINE results removed from Scopus prior to export
**Top 250 "best match" records exported

Key messages

- Current evidence describes at-home testing as a convenient, feasible, and economical means to increase testing frequency for more individuals, without stressing PPE supply and health care personnel.[1 2]
- The majority of sources focused on self-administered, diagnostic test performance as part of an experimental study. Additional findings included:
  - Supervised self-collection performed comparably well to clinician collection.
  - There was heterogeneity across the descriptions of types of tests (as described within the sources), processes and protocols for self-collection, and availability of information on test cost.
  - Studies found that mouth rinse/gargle specimens performed similarly to NPS for the detection of COVID-19. [3 4]
  - Three studies reported high sensitivity and specificity comparing nasopharyngeal swabs collected by healthcare providers to self-collected samples.[5 6 7]
  - Self-collected capillary blood samples for use in serologic testing was a good alternative to health care provider collected[8]

Implementation considerations

- Nasal swabs tests were reported as less expensive (and less accurate) then saliva tests. However, saliva tests had quicker turnaround time (within 30 mins).
  - Costs of nasal swabs identified in sources ($USD): Binax ($25); Ellume ($30, first approved by FDA); Lucira ($50); Astorino ($99)
  - Costs of saliva tests identified in sources ($USD): DxTerity ($110); Oxsed ($149)

- Home saliva tests were the most preferred self-administered tests. [9]

Key Gaps

- No study quantitatively measured or compared infection rates before and after the implementation of at-home testing.
- Few studies included true “at-home” testing (specimens collected unsupervised by untrained individuals).
- We found no published data on the implementation and effectiveness of these tests in a real-world setting.
- We found no information on best context or use-case for at-home tests.

Emerging evidence

- There may be sufficient available evidence on self-collected test performance (sensitivity and specificity) to conduct a systematic review or network meta-analysis.

Acknowledgement

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References

1. Lindner, A. K., Nikolai, O., Rohardt, C., Kausch, F., Wintel, M., Gertler, M., ... & Mockenhaupt, F. P. (2021). SARS-CoV-2 patient self-testing with an antigen-detecting rapid test: a head-to-head comparison with professional testing. MedRxiv.

2. Liao WT, Hsu MY, Shen CF, Hung KF, Cheng CM. Home Sample Self-Collection for COVID-19 Patients. Advanced biosystems. 2020 Nov;4(11):2000150.

3. Kandel CE, Young M, Serbanescu MA, Powis JE, Bulir D, Callahan J, Katz K, McCready J, Racher H, Sheldrake E, Quon D. Detection of SARS-CoV-2 in Outpatients: A Multi-Centre Comparison of Self-Collected Saline Gargle, Oral Swab and Combined Oral-Anterior Nasal Swab to a Provider Collected Nasopharyngeal Swab. Infection Control & Hospital Epidemiology.:1-20. doi: 10.1017/ice.2021.23.

4. Goldfarb DM, Tilley P, Al-Rawahi GN, Srigley JA, Ford G, Pedersen H, Pabbi A, Hannam-Clark S, Charles M, Dittrick M, Gadkar VJ, Pernica JM, Hoang LMN. Self-collected Saline Gargle Samples as an Alternative to Healthcare Worker Collected Nasopharyngeal Swabs for COVID-19 Diagnosis in Outpatients. J Clin Microbiol. 2021 Jan 29:JCM.02427-20. doi: 10.1128/JCM.02427-20. Epub ahead of print. PMID: 33514627.

5.McCulloch, D. J., Kim, A. E., Wilcox, N. C., Logue, J. K., Greninger, A. L., Englund, J. A., & Chu, H. Y. (2020). Comparison of unsupervised home self-collected midnasal swabs with clinician-collected nasopharyngeal swabs for detection of SARS-CoV-2 infection. JAMA network open, 3(7), e2016382-e2016382.

6.Shakir SM, Barker AP, Hillyard DR, Gilmore N, Barrett JW, Orlandi RR, Hanson KE (2021). Combined self-collected anterior nasal and oropharyngeal specimens versus provider-collected nasopharyngeal swabs for the detection of SARS-CoV-2. Journal of Clinical Microbiology; 59(1):e02291-20.

7. Hanson, K. E., Barker, A. P., Hillyard, D. R., Gilmore, N., Barrett, J. W., Orlandi, R. R., & Shakir, S. M. (2020). Self-collected anterior nasal and saliva specimens versus health care worker-collected nasopharyngeal swabs for the molecular detection of SARS-CoV-2. Journal of clinical microbiology, 58(11).

8. Brown L, Byrne RL, Fraser A, Owen SI, Cubas-Atienzar AI, Williams C, Kay GA, Cuevas LE, Fitchett JRA, Fletcher T, Garrod G, Kontogianni K, Krishna S, Menzies S, Planche T, Sainter C, Staines HM, Turtle L, Adams ER. Self-sampling of capillary blood for serological testing of SARS-CoV-2 by COVID-19 IgG ELISA. medRxiv. 2020.

9. Hall, E. W., Luisi, N., Zlotorzynska, M., Wilde, G., Sullivan, P., Sanchez, T., ... & Siegler, A. J. (2020). Willingness to use home collection methods to provide specimens for SARS-CoV-2/COVID-19 research: survey study. Journal of Medical Internet Research, 22(9), e19471.