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

A rapid review updated as of January 29, 2021

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Abbreviations

ANS	Anterior nasal swab
HCW	Health care worker
LDT	Laboratory developed technology
NPS	Nasopharyngeal swab
OPMT	Oropharyngeal and bilateral mid-turbinate swab
PCR	Polymerase chain reaction

EXECUTIVE SUMMARY

Purpose

As of February 2021, Canada continues to experience widespread community transmission of SARS-CoV-2. The extensive measures that have been implemented to mitigate virus transmission, as well as their related societal impacts, persist. Testing is a foundational component of the response to COVID-19. The testing and screening strategy for Canada is aimed at supporting related health authorities to reduce viral transmission and limit COVID-19 illness and death. To date, Health Canada has only authorized the sale and importation of COVID-19 diagnostic tests for use by health care professionals or other trained operators. Evidence suggests that in addition to diagnostic tests used by health care professionals, at-home (self-collected) testing is also being used internationally. There are no at-home (self-collected) diagnostic tests for COVID-19 currently approved in Canada. There is interest in understanding more about at-home testing strategies internationally and how they might be applicable to supporting Canada's COVID-19 testing and screening strategy. This rapid scoping review was conducted by members of the SPOR Evidence Alliance in response to a request from Health Canada's COVID-19 Testing and Screening Expert Advisory Panel. This report will outline the review's objectives and methods, summarize the findings from the evidence identified and how it meets the review objectives, and discuss any implications of the findings. Summary tables will be provided to aid in communicating the findings.

Objectives

To summarize the evidence on how at-home testing for COVID-19 has been implemented internationally. Specifically, there is interest in how at-home testing may fit into a broader COVID-19 test-trace-isolate strategy across jurisdictions.

Approach

A comprehensive literature search was conducted on **January 29, 2021** with the purpose of retrieving studies published from January 1, 2019 until the search date. The search was designed and executed by a library scientist in MEDLINE, Scopus, medRxiv, and the Cochrane Database of Systematic Reviews. A targeted grey literature search (OECD; WHO; CDC; ECDC; CADTH; National Public Health websites (e.g., Australia, New Zealand, UK, and others); Coronavirus resource centres (i.e., John Hopkins, COVID-END, CANCOVID, CORD19) and Google was also conducted to identify relevant media, technical and white paper reports related to the review area. Inclusion criteria was not limited to peer-reviewed publications and included letters of correspondence, commentaries and perspectives. Based on the rapid review approach, studies were screened independently for inclusion and data were extracted independently and reviewed by another team member for completeness.

Findings

We found 1063 unique published articles and 34 grey literature sources. After screening, 63 sources were included for data extraction (n=44 published articles, n=19 grey literature sources). Forty nine sources described at-home tests or self-collected specimen samples including: Rapid Antigen tests, PCR-tests with self-collected swab samples, Saliva specimen tests, mouth

rinse/throat wash, molecular virus tests, serology, and CRISPR (clustered regularly interspaced short palindromic repeats). Most of the sources focused on diagnostic tests, as opposed to tests focusing on identifying persons with past infection. Many studies focused on the performance of self-administered tests compared with PCR. Tests and related processes varied among sources. These sources reported that self-administered tests, although less accurate than PCR tests, were a suitable replacement for tests administered by health care workers. Self-administered fluid swabs and throat gargles often reported higher accuracy to self-administered nasal swabs.

Implications

While there is evidence that at-home tests are available around the globe, there are still gaps in the evidence. Several studies reported that home and/or self-administered testing is both feasible and acceptable. It is important to differentiate between self-administered tests that require laboratory analysis rather than at-home tests with near immediate results. Both will have particular considerations for implementation. The impact of at-home testing on the transmission of COVID-19 is unclear. No study in this review quantitatively measured or compared the infection rates before and after the implementation of at-home testing.

SUMMARY OF RAPID REVIEW

Rationale for review

Testing is a foundational component of any COVID-19 containment strategy. Emerging evidence indicates that at-home (self-collected) COVID-19 diagnostic tests are being used internationally; however, no at-home test is currently approved for use in Canada. To this end, Health Canada's Testing and Screening Expert Advisory Panel commissioned this rapid review in January 2021 to explore the available evidence in this area. The aim of this review was to identify the available evidence for the implementation of at-home testing for COVID-19, as well as to identify evidence for how at-home testing is embedded within a broader strategy of test-trace-isolate and its resultant impacts on COVID-19 transmission.

Review question(s)

The primary review question is what is the evidence about the implementation of at-home testing for COVID-19? The secondary question is how does at-home COVID-19 testing fit within a broader strategy of test-trace-isolate to mitigate COVID-19 spread? The population, concept and context for this rapid scoping review is: 1) population – persons who are eligible to be tested for COVID-19; 2) concept – at-home (self-collected or self-administered) COVID-19 testing; and 3) context – self-administered tests in any setting.

RAPID REVIEW METHOD

Our approach was informed by the steps outlined in Tricco and Straus[i,ii] and Peters, Godfrey and colleagues.[iii]

Search strategy

An experienced information specialist designed comprehensive search strategies in MEDLINE (Ovid MEDLINE All), Scopus (Elsevier), medRxiv, and the Cochrane Database of Systematic Reviews (CDSR) (Cochrane Library, Wiley). All database searches were executed on January 29, 2021, and results were limited to January 2019-current. The COVID-19 portion of the search was adapted for MEDLINE from the expert COVID-19 search strategy developed by expert searchers at Ovid for Ovid MEDLINE All, and subsequently translated to Scopus and CDSR.

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[i] Tricco AC, Straus SE. Rapid review methods more challenging during COVID-19: commentary with a focus on 8 knowledge synthesis steps. Journal of Clinical Epidemiology 2020, 126: 177-183.

[ii] Tricco AC, Langlois EV, Straus SE. Rapid reviews to strengthen health policy and systems: A practical guide. 2017. Available at: https://www.who.int/alliance-hpsr/resources/publications/rapid-review-guide/en/

[iii] Peters MDJ, Godfrey C, McInerney P, Munn Z, Tricco AC, Khalil, H. Chapter 11: Scoping Reviews (2020 version). In: Aromataris E, Munn Z (Editors). *JBI Manual for Evidence Synthesis*, JBI, 2020. Available from https://synthesismanual.jbi.global. https://doi.org/10.46658/JBIMES-20-12

The medRxiv search was a simplified version of the other database searches due to limitations in database search functionality. Results from the database searches were exported to Covidence for de-duplication and screening. Grey literature was retrieved using a combination of targeted website searching and a series of Google queries. The full details of all searches are included in Appendix A.

Screening & Data extraction

Covidence was used to review the titles and abstracts for inclusion/exclusion based on the criteria described in Appendix B. Because of the rapid turnaround of this request, abstracts were reviewed by single reviewers. Next, articles were screened in duplicate by full text using the same inclusion/exclusion criteria found in Appendix B. Data extraction was completed using the following end-points: (1) country; (2) setting; (3) testing location; (4) study design (if applicable); (5) date of study or publication of source; (6) purpose of study; (7) target population; (8) eligibility criteria for testing; (9) total number of participants; (10) COVID-19 symptom status; (11) type of test employed; (12) organization leading implementation; (13) administrator of tests; (14) testing protocols/processes; (15) impact of testing on COVID-19 transmission; (16) lessons learned and recommendations; and (17) other outcomes.

FINDINGS

Overview of included studies

A total of 1093 unique published articles were identified from the database search. Another 34 grey literature sources were identified. After screening, 63 sources were included for data extraction (n=44 academic publications; n=19 grey literature sources) (see PRISMA – Appendix C). It should be noted that not all end-points were described/available for each extracted source. Upon secondary review of all extracted data, we removed three sources – all were duplicate references already represented within our extracted data but improperly indexed.

Findings are presented over the following pages in accordance with data extraction points that are relevant to Health Canada's Testing and Screening Expert Advisory Panel. A full annex with relevant data points and references for sources can be found in Appendix D.

SECTION 1. Evidence for types of at-home (self-collected) diagnostic or antibody COVID-19 tests and their performance

Types of at-home (self-collected) tests

Forty-nine sources mentioned the use of at-home tests or self-collected specimen samples for diagnosing COVID-19 or identifying antibodies. Several studies included or described multiple self-collected specimens. Most of the sources described molecular or antigen (diagnostic) rather than antibody tests. A summary of the descriptions of types of tests or self-collected specimens from the sources is as follows:

- Rapid antigen tests[3–16]
- Self-collected swab (oral, nasal, buccal)[7,17–34]
- Saliva specimen[6,7,10,15,25–27,33–39]
- Mouth rinse gargle/throat wash[31,39]
- "Molecular virus"[40] or LAMP[41]
- Serology or capillary specimen (antibody)[36,42–45]
- CRISPR[6]

There was substantial 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. In addition, not all sources that described at-home or self-collected specimens included information on performance (sensitivity or specificity of tests). For example, Davis and colleagues[45] aimed to describe the prevalence of indicators of COVID-19 that would be useful for future cohort studies. In this cross-sectional study (n=1882 postgraduate students and staff at Kings' College London, UK), participants completed both a survey and a self-collected antibody test using an IgG/IgM test kit based on "lateral flow" technology. The presumed data collection was at-home or in a community dwelling environment, but this was not explicitly stated in this preprint. Moreover, this source states that the sensitivity and accuracy of the antibody test used in this study are reported elsewhere.

Aatresh (2021) and colleagues (n=2066 enrolled, n=1872 completed baseline data collection) conducted a cross-sectional survey of the population in Massachusetts, using at-home, self-collected serological (finger-prick) specimens[42]. Test kits were mailed via United States Postal Service to participants and the test kit included "two spring-loaded lancets, a biohazard bag, and instructions for self-administered finger-prick blood collection". Seroprevalence was reported but performance of the tests was not described.

Significant information gaps regarding at-home tests were also reported by Taylor-Phillips and colleagues (2020), who aimed to explore online websites selling at-home self-sampling and testing kits for COVID-19[46]. They specifically explored the completeness, accuracy and information on tests provided by these websites. In this study, they were focused on identifying websites selling both at-home sampling and at-home testing kits for COVID-19 (molecular virus and/or antibody tests) in both the UK and the USA for general population use. The authors reviewed 27 websites selling tests to consumers. Information extracted from the websites included: test manufacturer, type of test, when the test was recommended; claims about test accuracy; advice about changing behaviour in relation to test results; accreditation; and cost. Many websites failed to provide information on the accuracy of tests (no information was provided for 12/41 tests described) and how to interpret results (no information for 21/41 tests), suggesting misleading and/or incomplete information currently exists about at-home COVID-19 tests (at least, at a public-facing level).

Performance of at-home or self-collected specimens – sensitivity and specificity

Most of the research studies (accounting for about half the sources) that described at-home specimen collection or self-collection also reported on their performance[5,9,10,20–26,30,33–35,37–39,43,47]. These studies were found from a variety of countries across the globe. High-level information on test performance and information on the studies is provided over the following pages, according to country of study origin.

Canada

Two studies (cross-sectional designs) from Canada that assessed performance of self-collected specimens were found – one in Toronto, Ontario[24] (and the other in Vancouver, British Columbia[39]. Both studies found that mouth rinse/gargle specimens performed similarly to NPS for the detection of COVID-19. Only the Goldfarb study described the option of self-collection of specimens "at-home" and included adults and school-age children; both studies indicated that self-collection took place in an outpatient clinic and/or assessment centre.

Kandel and colleauges evaluated the performance of three self-collected specimen techniques for the detection of COVID-19 in a primarily adult, outpatient population. Study participants were drawn from those presenting to three COVID-19 outpatient assessment centres for testing and NPS collection. The self-collected specimens were saline gargle (n=14491), oral swab (n=3542) and combined oral-anterior nasal swab (n=1587). A total of 340 individuals tested positive for SARS-CoV-2. Performance of self-collected swabs was assessed; adjusted sensitivity was as follows: 1) saline gargle 0.90 (95% CI: 0.86-0.94); 2) oral swab 0.82 (95%CI: 0.72-0.89); 3) combined oral-anterior nasal swab: 0.87 (95% CI: 0.77-0.93) as compared to the NPS. Findings suggest that studies found that mouth rinse/gargle specimens performed similarly to NPS for the detection of COVID-19[24].

In the second study from Canada, three types of samples were collected from adults and school-aged children for the detection of SARS-CoV-2: NPS, self-collected mouth rinse/gargle and saliva specimens. All participants had either previously tested positive for COVID-19 or were symptomatic and household contacts of confirmed COVID-19 cases. When comparing across tests, self-collected mouth rinse/gargle samples were statistically similar to HCW-collected NPFS for the positive detection of coronavirus, demonstrating the highest sensitivity (comparing matched samples, sensitivity of mouth rinse/gargle (LDT)= 39/40 or 97.5% (95% CI: 86.8-99.9); mouth rinse/gargle (GeneXpert) = 38/39 or 97.4% (95% CI: 86.5-99.9)). Mouth rinse/gargle self-collection was also highly acceptable and preferred by participants. On the other hand, saliva samples were significantly less sensitive to detect SARS-CoV-2 and less acceptable to mouth rinse/gargle[39]

United States

We identified four studies from the United States. Two of the studies[20,30] focused on self-collection of specimens at home, and the remaining two focused on self-collection in a drive-through testing site (presumed to be observed by health care workers)[21,38].

Kojima et al (2020) performed home-based specimen collection for COVID-19 testing, using unsupervised self-collected specimens and clinician-supervised self-collected specimens (cross-sectional design, n=180 samples from 45 non-hospitalized participants). All samples were collected in private homes in Los Angeles County, California, and sent to the lab for analysis. Specimens included: self-collected oral fluid swab specimens, self-collected nasal swab specimens, and nasopharyngeal swabs. Clinician-collected nasopharyngeal specimens were collected from all patients for comparison. No sample type captured all SARS-CoV-2 infections. Supervised self-collection performed comparably well to clinician collection. Clinician-supervised oral fluid swab specimens detected 90% infected individuals, clinician-supervised nasal swab specimens detected 85% infected individuals, clinician-collected posterior nasopharyngeal swab specimens detected 79% infected individuals and unsupervised self-collected oral fluid swab specimens detected 66% infected individuals. There was no difference in testing performance when comparing those with and without active symptoms[30].

Three studies compared nasopharyngeal swabs collected by healthcare providers to self-collected samples and all reported high sensitivity and specificity. McCulloch et al (2020) compared the sensitivity and specificity of unsupervised home self-collected mid-nasal swabs compared to nasopharyngeal swabs collected by clinicians at a testing site. In 185 participants, sensitivity was 80% and specificity was 98%, and Cohen's kappa was 0.81, suggesting substantial agreement between tests[20].

In a cross-sectional study conducted by Shakir and colleagues (2021), the authors found that there were no statistically significant differences in test positivity between self- collected and health care worker collected swabs among symptomatic individuals attending a drive-through

assessment centre (n=423 participants). The study reported 98.8% qualitative agreement between self-collected dual oropharyngeal and anterior nares swabs and health care provider collected nasopharyngeal swab; percent positivity was higher for health care provider collected nasopharyngeal swab at 27.7% as opposed to 27.0% for self-collected dual swabs (not statistically significant, p=0.88); 4/423 participants were identified as positive on the HCW-administered test alone, while 1/423 participants were identified based on their self-collected test alone. The authors further concluded that the use of self-collected tests was feasible[21].

Lastly, Hanson and colleagues evaluated the performance of patient self-collected ANS and saliva versus that of health care provider-collected NPS for SARS-CoV-2 diagnostic testing. Among 368 symptomatic patients at a drive-through testing site, the percent positive agreement between NPS and ANS or saliva was 86.3% (95% CI: 76.7 to 92.9) and 93.8% (95% CI: 86.0 to 97.9), respectively. The percent negative agreement was 99.6% (95% CI: 98.0 to 100.0) for NPS versus ANS and 97.8% (95% CI: 95.3 to 99.2) for NPS versus saliva. More cases were detected by the use of NPS (n=80) and saliva (n=81) than by the use of ANS (n=70), but no single specimen type detected all SARS-CoV-2 infections[38].

United Kingdom

Two studies from the United Kingdom reported on the performance of self-collected tests. Atchison et al. (2020) conducted a cross-sectional survey assessing the usability and acceptability of home-based serological self-testing using lateral flow immunoassays (LFIA)[47]. Results of a public engagement and pilot testing (315 members of the public) informed the national study (17 411 individuals from 8508 households). Most respondents obtained a valid result (LFIA1: 91.5%; LFIA2: 94.4%). Overall, there was substantial concordance between participant and clinician interpreted results (kappa: LFIA1 0.72; LFIA2 0.89). In a study of 39 participants from England with and without a history of COVID-19 infection, Brown et al. (2020) found that self-collected capillary blood samples for the use in serologic testing was a good alternative to health care provider collected venous blood as 97% of participants were successful at collecting samples[43].

Other countries

Studies from Germany[5,9], Singapore[25,33,35], Australia[48], Italy[34] Japan[10], Iran[22], Denmark[23], Spain[37] and Brazil[26] also described the performance of self-collection of specimens or self-testing for COVID-19.

A study conducted in March 2020 in Australia provided early evidence for self-administered tests. Wehrhahn et al. (2020) conducted a prospective study to compare the accuracy of self-administered and healthcare provider administered COVID-19 tests. A sample of 236 participants who attended two testing sites in Australia participated in the study. Of the 25 participants who tested positive for COVID-19 during the study period, all 25 cases were

detected by the self-administered test and 24/25 cases were detected by the healthcare provider-administered test[48].

Based on a study of 201 symptomatic patients in Brazil, Braz-Silva et al (2021) found that at-home self-collected saliva and nasal-oropharyngeal swabs could successfully be used for the surveillance of COVID-19. This was based on a significant agreement (kappa=0.58) found between combined nasal and oropharyngeal swab and saliva for sensitivity. Sampling sensitivity for a combined swab was 74% and for the saliva test was 79%. The study did not confirm if symptomatic patients were truly infected with COVID-19 with a PCR test[26]

Two studies compared numerous self-administered tests to determine their usefulness in detecting COVID-19, and both studies confirmed that positive self-administered tests should be followed-up with a RT-PCR test. Corman and colleagues (2020) compared seven different antigen point of care tests (n=138 samples were used) to determine their usefulness in asymptomatic healthy volunteers (a trained health care worker supervised the self-administration). They assessed: 1) Abbott Panbio COVID-19 Ag Rapid Test; 2) RapiGEN BIOCREDIT COVID-19 Ag; 3) Healgen 348 Coronavirus Ag Rapid Test Cassette (Swab); 4) Coris Bioconcept Covid.19 Ag Respi-Strip; 5) R-349 Biopharm RIDAQUICK SARS-CoV-2 Antigen, NAL von minden; 6) NADAL COVID19-Ag Test; and 7) 350 Roche/SD Biosensor SARS-CoV Rapid Antigen Test. They compared 105-115 samples of each test to a RT- PCR on each and found that tests were between 88.2% and 100% accurate to the RT-PCR[9].

Nagura-Ikeda et al. (2020) assessed the clinical performance of six molecular diagnostic tests and a rapid antigen testing self-collected saliva from 103 patients with lab-confirmed COVID-19. SARS-CoV-2 RNA in saliva was detected using a quantitative reverse transcription-PCR (RT-qPCR) laboratory-developed test, a cobas SARS-CoV-2 high-throughput system, three direct RT-qPCR kits, and reverse transcription–loop-mediated isothermal amplification (RT-LAMP). The viral antigen was detected by a rapid antigen immunochromatographic assay. Of the 103 samples, viral RNA was detected in 50.5 to 81.6% of the specimens by molecular diagnostic tests, and an antigen was detected in 11.7% of the specimens by the rapid antigen test. Viral RNA was detected at significantly higher percentages (65.6 to 93.4%) in specimens collected within 9 days of symptom onset than in specimens collected after at least 10 days of symptoms (22.2 to 66.7%) and in specimens collected from asymptomatic patients (40.0 to 66.7%). The authors concluded that self-collected saliva is an alternative specimen option for diagnosing COVID-19[10].

In a study from Germany, Lidner and colleagues (2021) performed a prospective diagnostic accuracy study of self-collected nasal mid-turbinate (NMT) sampling for rapid point of care (POC) antigen tests, compared with professional oropharyngeal/nasopharyngeal-sampling for RT-PCR in 146 participants. Most participants (80.9%) considered the rapid test as rather easy to perform. Sensitivity with self-testing was 82.5% (33/40 RT-PCR positives detected; 95% CI: 68.1 to 91.3), and 85.0% (34/40; 95% CI: 70.9 to 92.9) with professional testing. The positive percent agreement between self-testing and professional testing on Ag-RDT (antigen detection

rapid diagnostic test) was 91.4% (95% CI: 77.6 to 97.0), and negative percent agreement was 99.1% (95% CI: 95.0-100). At high viral load (>7.0 log10 SARS-CoV-2 RNA copies/ml), sensitivity was 96.6% (28/29; 95% CI: 82.8 to 99.8) for both self- and professional testing[5].

Similarly, Basso et al (2020) paired self-collected saliva (Salivette) and NPS were obtained to perform rRT-PCR, chemiluminescent (Lumipulse G) and POC (NPS: Fujirebio and Abbott; saliva: Fujirebio) for SARS-CoV-2 antigen detection. The overall agreement between NPS and saliva rRT-PCR was 78.7%, reaching 91.7% at the first week from symptom onset. SARS-CoV-2 CLEIA (chemiluminescence enzyme immunoassay) antigen was highly accurate in distinguishing between positive and negative NPS (ROC-AUC=0.939, 95% CI:0.903-0.977), with 81.6% sensitivity and 93.8% specificity. This assay on saliva had an overall good accuracy (ROC- AUC=0.805, 95% CI:0.740-0.870), reaching the optimal value within 7 days from symptom onset (Sensitivity: 72%; Specificity: 97%). POC antigen in saliva had a very limited sensitivity (13%), performing better in NPS (Sensitivity: 48% and 66%; Specificity: 100% and 99% for Espline and Abbott, respectively), depending on viral loads[34].

Abdollahi et al. (2020) randomly enrolled 50 symptomatic adult patients admitted to the infectious diseases ward during the study period (non-randomized, experimental study design). A set of naso- and oropharyngeal swabs were collected by lab technicians and patients themselves, respectively, for rRT-PCR testing. The overall percentage of agreement among both nasopharyngeal and oropharyngeal swabs taken by a lab technician and patients was 76% with a kappa value of 0.49 (p=0.001)[22].

Therchilsen et al (2020) (cross-sectional design, n=109 participants) aimed to explore the correlation and diagnostic sensitivity of a simple low-cost technique for self-collected samples as an alternative to HCW-collected samples in the diagnosis of SARS-CoV-2 in symptomatic individuals. The proportion of SARS-CoV-2-positive samples was 16/109 (14.7%) for the self-collected samples in comparison to 17/109 (15.6%) for the HCW-collected samples. Cohen's kappa of 0.82 (p<0.001) demonstrated an acceptable agreement between HCW-collected swabs and self-administered swabs. There were no significant differences in diagnostic sensitivity for the self-collected and HCW-collected samples, corresponding to 84.2% and 89.5%, respectively (p=0.81). However, of the 19 positive samples, only 14 (74%) were found positive by both tests[23].

Trobajo-Sanmaratin (2021) aimed to evaluate the utility of saliva for the diagnosis of SARS-CoV-2. Saliva and nasopharyngeal samples were collected from 674 patients with suspected SARS-CoV-2 infection. The virus detection in saliva compared to a nasopharyngeal sample was 52% (CI: 46.3-57.4%). The specificity of the saliva sample was 99.1% (CI: 97-99.8%), and the concordance between samples was 75% (kappa=0.5, CI: 0.56-0.56). The authors noted that saliva sample utility was limited for clinical diagnoses but could be a useful alternative for massive screening when the availability of trained professionals or PPE was limited. One out of two NP positive samples was detected with saliva samples. Excluding invalid results, the

sensitivity and specificity for saliva samples were 51.9% (95% CI: 46.3%–57.4%) and 99.1% (95% CI: 97.4%–99.8%), respectively. Including invalid results of saliva samples, the sensitivity values were similar, meaning the data exclusions would not significantly influence the outcome. The agreement rate between the two samples was 75%[37].

Three studies were conducted in Singapore and all assessed the association between healthcare provider NPS and self-administered swabs[25,33,35]. In a study of 200 male migrant workers (cross-sectional), the sensitivity of both naso-oropharyngeal saliva and self-administered nasal swabs were compared with NPS. Tests were conducted at 2-3 day intervals to compare sensitivity across time. Test concordance between different sample sites was good, with a kappa statistic of 0.616 for nasopharyngeal and self-administered nasal swabs, and 0.537 for NP and saliva. In confirmed symptomatic COVID-19 participants, the likelihood of a positive test from any sample fell beyond 14 days of 21 days since symptom onset. There was similar agreement in the detection of COVID-19 using self-collected saliva samples and PCR. Self-collected nasal swabs did not show the level of sensitivity for detecting COVID-19 compared with the saliva samples[35].

Tan et al (2020) conducted a diagnostic test to compare the accuracy of samples for SARS-CoV-2 collected by healthcare providers (swab) with samples collected through self-collection (saliva and OPMT) using n=401 known COVID-19 positive patients and n=100 non-COVID-19 positive persons. They found detection rates of the healthcare provider swab (83.8%, 95% CI:79.8-87.3), self-swab (75.1%, 95% CI:70.1-79.2), saliva (74.3%, 95%CI: 69.7-78.5) and combined self-swab + saliva (86.5%, 95% CI: 82.8-89.7). Compared with the healthcare provider swab, sensitivity for the self-swab was 83.6%, saliva: 80.6% and combined self-swab and saliva: 92.3%. Furthermore, the authors found that self-collected saliva and self-collected swabs were less sensitive than healthcare provider swabs for the detection of COVID-19. However, the combined self-collected saliva and swab improved sensitivity (comparable to HCW swab), particularly when the disease was at its peak (cycle threshold <30)[33].

Ku et al. (2021) conducted a cross-sectional study of 42 COVID-19 positive patients to validate the diagnostic performance of self-administered buccal and saliva samples, compared with NPS collected by trained health care workers. All tests were conducted in a healthcare setting. Among the 42 participants, 73.8% (31/42) tested positive by any one of the three tests. With reference to NPS, the saliva test had 66.7% percent positive agreement, 91.7% percent negative agreement, and 69.0% overall agreement, while the buccal swab had 56.7% percent positive agreement, 100% percent negative agreement, and 73.8% overall agreement. Authors recommended primary screening be performed with a saliva test or buccal swab, with a negative test warranting a confirmatory NPS[25].

At-home tests described in media or opinion articles

Many media articles originated from the United States to describe at-home tests available for purchase. These are described over the following pages.

In a news article, Pawlowski (2021) described several at-home testing kits that have been approved by the FDA[11].

- The Binax test ($25) correctly identifies 91.7% of positive samples and negative samples (100%). For this test, people swab themselves and the sample is analyzed through a test card and smartphone app under the supervision of an eMed telehealth provider. For patients younger than 15 years of age, the FDA recommends that an adult perform the nasal swab. Test results are ready in about 20 minutes.

- The Ellume test ($30) correctly identifies 96% of positive samples and 100% of negative samples in people with symptoms. Among people who are not symptomatic, the test correctly identifies 91% of positive samples and 95% of negative samples. It requires a user to perform a nasal swab and place the sample into a Bluetooth-connected analyzer that syncs with a smartphone app.

- The Lucira test ($50) correctly identifies 94% of positive samples and 98% of negative samples when compared to the results of a high-sensitivity test. The test works by swirling the self-collected sample swab in a vial that's then placed in the test unit. Results appear in about 30 minutes and can be read directly from the test unit's light-up display, according to the FDA.

Contify Life Science News (2020) also published a media release to announce that Ellume had requested EUA (emergency use authorization) from the FDA on December 9th, 2020. The Ellume test is a nasal swab that when inserted into an analyzer sends test results to a smartphone within 15 minutes. The article described a clinical trial that was conducted in 5 U.S states with 198 participants. Findings from the trial noted the sensitivity (95%) and specificity (97%). Similarly, Newstex (2020) wrote a media advisory to announce the approval of Ellume's at-home test by the FDA in the U.S. The article briefly described the testing protocol for Ellume and detailed Ellume's plan to scale up delivery of the at-home tests into 2021. Perrone (2020) also provided a short announcement on the approval of Ellume's nasal swab or saliva test that the public can purchase at a pharmacy for $30[8].

In another news article, Astorino (2021) reported on the best at-home COVID-19 tests of 2021. Through speaking with experts, the advantages and disadvantages of each test were provided in detail including information on cost, accuracy (180 detectable units/mL), and insurance coverage. The Empower DX Nasal Swab was listed as the top test for its accuracy, option for

repeat testing and cost. This test has no eligibility requirements and is the least expensive nasal swab at $99[49].

Stella (2021) described experiences with DxTerity, a saliva-based home COVID-19 test kit, including its delivery, the sample collection process, its return shipment, and its advantages and disadvantages. The advantages included its availability via Amazon, ease of use, and pre-packaging with a return shipping label attached to the box. The disadvantages were that it required an up-front, out-of-pocket payment of $110, which was not guaranteed to be reimbursable via insurance and there were also concerns over how accurately it identified positive samples (especially in those without COVID-19 symptoms)[27].

In a news article, Seaver (2021) described the accuracy, accessibility, availability, methodology, and differences between 10 swab and saliva at-home tests. The tests included antigen tests (Binax, Ellume); RT-PCR (CRL Rapid Response DxTerity, Everlywell, LetsGetChecked, Vault, Phosphorus, Pixel by LabCorp); and molecular real-time loop mediated amplification reaction tests (Lucira). The author reported that the tests have comparable efficacy rates and that some need to be analyzed at a lab whereas three can be analyzed right at home for fast results. The article further described that at-home testing had the potential to make screening for COVID-19 more convenient and available and that at-home testing kits appeared to be as good as on-site tests at detecting the SARS-CoV-2 virus[13].

In another news article, O'Brien et al (2021) reviewed four nasal swab home tests, which were noted to have the advantage of helping the public avoid the fear of getting infected at a testing site. They authors indicated that the tests provided results quickly and were accurate compared to RT-PCR. The tests included: (1) Vault Health PCR ($118) genetics, which is ordered online, delivered within 24 hours, done at home under HCW supervision. Results are then shipped back for results in 24-48 hours with less than 1% chance of a false negative; (2) Ellume ($30), which is a test done at pharmacies as a nasal swab and uses a smartphone app with results in 15 minutes; (3) Pixel ($119) and; (4) Lucira ($50), which are ordered online and are nasal swabs[29].

A Globalnewswire (2020) report provided limited information on the RapiGEN Inc COVID-19 home test kit after its approval by the FDA. The test is suitable for point of care testing with no extra equipment needed and is easy to use with results in 5-10 minutes. If the specimen contains IgM antibodies to SARS-CoV-2, a coloured line appears in the T line area. The RapiGen home test kit is a lateral flow immunochromatographic assay (LFIA) for the qualitative detection of IgG antibodies to COVID-19 in blood, serum or plasma specimens[50].

Sources also reported the implementation of rapid self-tests at airports and universities. Impact News Service (2020) announced that Wellness for Humanity was to release a novel approach to vending machines with at home saliva-based testing kits that have 97.4% accuracy and 100% specificity and cost higher than average at $149. In another news article, O'Neill 2020 described that Oxsed had rapid testing technology (approximately 15 minutes) for home kits that were employed at airports, in sports teams and among food workers to aid with testing[17,51].

A final media article by Global Data Point (2020) provided a brief and general overview of a newly developed COVID-19 testing device. This device uses nasal or throat swabs which can be placed in the device and synced with a SmartPhone to provide results in 20 minutes. One device can be used on up to six individuals[52].

SECTION 2. Evidence for implementation and impact of at-home (self-collected) diagnostic or antibody tests

Implementation considerations

Sources identified several lessons from the implementation of at-home and self-administered testing that may be relevant for future research and practice. Study findings may only be applicable to adult populations – rather than youth or children.

Feasibility and acceptability

Several studies reported that home and/or self-administered testing is both feasible and acceptable. In an online survey (n=586 adults from the United States), Bien-Gund et al (2021) found that the respondents were highly motivated to use self-test kits for COVID-19. Overall, 90% indicated that they would distribute such kits to their contacts if infected, 86% would accept such kits from infected contacts, and 83% would order online kits if needed[53].

Three studies reported on the findings of surveys that identified respondents' preferred testing modalities. All studies suggested that self-collection of specimens was an acceptable approach to testing and could play a role in the COVID-19 response.

- Hall et al (2020) conducted an online survey (n=1425 adults in the United States) to determine which type of test participants would be willing to take to assess their status for having COVID-19. Using a five-point Likert scale, they found that adults preferred self-administered home testing the most (saliva 4.5/5; throat 4.4/5), followed by drive-through testing (throat swab 3.8/5) and clinic (throat swab 3.5). At home blood tests (3.8/5) were ranked higher than a clinic blood test (3.6/5)[54].

- In a similar survey of 1260 US adults, Siegler (2020) assessed participants' willingness to take a COVID-19 test. Home specimen saliva testing was the most preferred (92%) followed by home throat swabs (88%). There was attenuated willingness for drive-through swab testing (71%). Only 60% were willing to get a lab throat swab[55].

- When comparing self-collected and health professional administered tests, respondents in Therchilsen et al's survey (2020) preferred self-collection (47/109, 43.1% participants)

compared with 29/109 (26.6%) who preferred collection by HCWs. About a third of respondents (33/109, 30.3%) did not have any preference. [23].

Based on the pilot study results from 167 adult residents of Strasbourg, France, Tonen-Wolyec et al (2020) concluded that among volunteer participants, the self-administered serological screening tool was used appropriately by the participants and the majority were able to self-administer it with no help and to interpret the results appropriately (1.5% misinterpreted results)[44]. In addition, Braz-Silva et al (2021) found that at-home self-collected saliva and nasal-oropharyngeal swabs were feasible for the surveillance of COVID-19 in a sample of 201 symptomatic patients in Brazil[26]. Atchison et al. (2020) conducted a cross-sectional survey assessing the usability and acceptability of home-based serological self-testing and concluded that over 98% respondents attempted the test and over 97% completed it[47]. There were limitations with the usability of the kits. Most people found the instructions easy to understand but some reported difficulties with the lancet and pipette (17-31%). Adenjii (2020) also noted the importance of individuals having a good grasp of the processes for sample collection; that self-collection sampling may also need to take into consideration literacy, age and social circumstances to ensure integrity of the collected specimens[19].

Logistics and support

Lidner (2021) suggested that self-testing should be accompanied by widespread public campaigns informing about limited sensitivity, the importance of complementary hygiene measures, e.g., mask use, physical distancing, and the necessity of self-quarantine in case of a positive test[5]. In a news article reviewing the UK National Health Services' Test and Trace Program, Kirby & Jones (2020) described that a 24-hour turnaround time for at-home COVID-19 tests was not possible as only 9% of people received their results in this timeframe, while 31% waited 24-48 hours and 56% waited more than 48 hours for a result[56]. Similarly, Zimba et al. (2020) reported survey results where respondents were interested in home testing if the results could be obtained immediately or same day[57]. Stella (2021) described their personal experience with a home COVID-19 test kit, including how it was delivered, the sample collection process, its shipment, and its advantages and disadvantages[27].

In a study where German schoolteachers repeated high frequency, self-collected, COVID-19 rapid antigen testing (Hoehl 2020), support was provided for those taking self-testing without medical or HCW supervision. This included a hotline for those who needed either technical support or medical support, or when an inconclusive result was found. These processes received positive feedback from the participants and it was noted that they could inform future home-testing programs and interventions[3].

Outreach

Sources described a variety of outreach methods for at-home testing or self-collection of specimens. For home testing, Aetresh (2021) shipped at-home specimen kits through the

United States Postal Service[42], while Royal Mail was used to distribute and collect tests for the NHS Test-and-Trace program[56]. Six studies mailed study invitations for recruitment[4,47,58] and one study selected participants via door-to-door sampling[44]. Bragg 2021 outlined a protocol for University of California San Diego students where tests are purchased online and then dispensed from a vending machine[28]. After a drop of saliva is procured, the vial is dropped off at any FedEx location to be shipped to the company and results are available within 24-48 hours. It was also suggested that home tests could be available in drugstores for patients to swab their nose, run the test and get results in as little as 20 minutes[16]. For a research study on home testing, participants were recruited with social media and online advertisements[54] (Hall, 2020). For self-administered testing not completed in home, patients were recruited in hospitals[10,22], or at testing clinics[20,48].

Evidence for the impact of at-home or self-testing on COVID-19

The impact of at-home testing on the transmission of COVID-19 is unclear. No study in this review quantitatively measured or compared infection rates before and after the implementation of at-home testing. Hoehl et al. (2020) believed the self-collected, rapid antigen tests may have prevented further cases at German schools by accurately identifying individuals with high viral loads[3]. Lindner et al. 2021 suggested that based on recent modelling data, viral transmission could have been significantly reduced by repeated screening (the sensitivity is of minor importance), combined with other public health measures[5].

Qualitative impacts of at-home testing

The available evidence has centred around the qualitative impact of various at-home tests. The most commonly reported positive impacts included:

- Alleviating the sample collection burden on health care providers[5,37]
- Protecting health care providers and the general public from potential exposure[13,59,60]
- Receiving positive feedback from users[23,42,55].

Uniquely, Pawlowski (2021) suggests that at-home tests could significantly change people's behaviours around self-isolation. By informing people of their current COVID-19 positive status, their willingness to self-isolate as per public health directives may increase[11].

Overall, 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[5,28,31,37,59].

Only two sources included in this review (both media releases) described a formal process of reporting testing results to local publica health officials[8,61]. The rapid, at-home antigen test developed by digital diagnostics company Ellume connects to an app via Bluetooth and through a "secure cloud connection", the test results are able to be shared with health authorities,

employers and educators "for effective COVID-19 mapping"[8]. PR Newswire (2020) wrote a news story about Baylor Genetics' at-home test kit, mentioning that both positive and negative results are automatically reported to appropriate regulatory bodies by the company[61]. Most studies did not disclose how testing outcomes would be disclosed to public health agencies, however, oftentimes testing results were recorded by researchers in online surveys[4,5,27,47,54] or through standardized forms[3] and the samples were sent to a designated clinical laboratory[22,42]. Government officials could presumably obtain testing outcomes data from these sources.

Two studies discussed the potential that self-administered tests could have on the health system and health care workers' workload. Lindner et al (2021) found that self- testing with Ag-RDTs not only had a negative effect on the workload of overstretched RT-PCR capacity but also increased workload of medical personnel through an increase in access to frequent hospital testing throughout the pandemic[5]. Lopez-Lopes (2020) found that clinical sample pooling followed by RNA extraction and routine protocols to detect SARS-CoV-2 RNA may have increased the testing capability without stressing the current limitations[31]. Although pooling may have decreased sensitivity, it would have identified more infectious individuals and allowed for more frequent testing, suggesting that this approach may be a feasible, economical way to test for COVID-19 for surveillance strategies.

IMPLICATIONS OF REVIEW FINDINGS

This review identified a variety of sources that described the availability and use of at-home testing. The majority of the sources described tests for the diagnosis of COVID-19 and a small number focused on antibody testing. This suggests that efforts to-date are prioritizing the development of at-home testing approaches that will identify active SARS-CoV-2 virus rather than approaches that identify individuals who have been previously infected. The performance of tests was also described by many, but not all, sources. There were no studies that described how self-testing was embedded into a broader scheme of test-trace-isolate. Authors reported mixed results about the ease of use of self-collected specimens; however, this was also dependent on the type of specimen collected and the population. Sources reported that at-home tests had the potential for utility and there was strong willingness to both self-collect samples or conduct at-home tests. There appear to be sufficient findings from this scoping review to conduct a systematic review or a network-meta-analysis to compare the performance of COVID-19 at home tests.

GAPS IN EVIDENCE

Most of the included studies were focused on assessing the performance of self-collected specimens compared with standard COVID-19 diagnostic testing processes. Only a few studies included true "at home" testing; self-collected specimens in an outpatient clinic or under HCW supervision were the most common. While most media articles described the availability of at-

home tests to consumers, we did not find any published data on the implementation and effectiveness of these tests in a real-world setting. Furthermore, we did not identify any studies that quantified the impact of at-home testing on transmission. This is a noted gap in the literature and suggests a lack of studies to better understand the utility of these tests at a population level.

CONCLUSION

This review found that at-home and self-administered diagnostic tests for COVID-19 have been implemented across the globe and are accessible to the general public in many countries. Studies are still being conducted to understand the performance of at home tests and/or self-collected specimens in comparison to standard HCW-collected, PCR diagnostics. The evidence to-date suggests that there is a place for at-home and self-administered tests within broader test-trace-isolate schemes; however, there is no evidence to suggest they should replace standard best practice. Advantages for their use have been described but there is still information needed on implementation and evaluation within real-world settings. Implementation must also consider communications to diverse audiences about test performance, processes and interpretation of results. It is not currently known how at-home testing impacts transmission of COVID-19.

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60. Behera B, Mohapatra PR, Payal P, Rath S, Saha S, Mishra B. Self-collection combined with pooled testing: how reliable to accept as evidence?. *Eur J Emerg Med*. 2020;27(5 PG-386):386. doi:https://dx.doi.org/10.1097/MEJ.0000000000000731
61. PR Newswire. Baylor Genetics Launches Accessible , At-Home COVID-19 Test ; From the comfort of one ' s home , individuals can order and receive all the materials for Baylor Genetics ' at-home test for COVID-19 . The results of the test will notify individuals if they. PR Newswire. NS -. Published 2020.

Appendix A

Search strategy details

All database searches were executed on January 29, 2021.
Ovid MEDLINE
COVID-19 filter: adapted from Ovid filter
https://tools.ovid.com/coronavirus/Covid-19%20search%20notes.pdf

#	Query
1	exp Coronavirus/
2	exp Coronavirus Infections/
3	(coronavirus* or corona virus* or oc43 or nl63 or 229e or hku1 or hcov* or n or covid* or sarscov* or sarscov* or sars-coronavirus* or severe acute respi syndrome coronavirus*).mp.
4	(or/1-3) and ((20191* or 202*).dp. or 20190101:20301231.(ep).)
5	((pneumonia or covid* or coronavirus* or corona virus* or ncov* or 2019-nc sars*).mp. or exp pneumonia/) and Wuhan.mp.
6	(2019-ncov or ncov19 or ncov-19 or sars-cov2 or sars-cov-2 or sarscov2 or sarscov-2 or sarscoronavirus2 or sars-coronavirus-2 or coronavirus-19 or covid19 or covid-19 or covid 2019 or "2019-novel cov" or ((novel or new or nouveau) adj2 (cov or ncov or covid or coronavirus* or corona virus or pandemi*2)) or (coronavirus* and pneumonia)).mp.
7	covid-19.rx,px,ox. or severe acute respiratory syndrome coronavirus 2.os.
8	or/5-7
9	4 not (camel* or dromedar* or equine or coronary or coronal or covidence* covidien or influenza virus or bovine or calves or tgev or feline or porcine or erinaceus or bcov or ped or pedv or pdcov or fipv or fcov or canine or ccov zoonotic or avian influenza or h1n1 or h5n1 or h5n6 or ibv or murine corona*).mp.
10	8 and (camel* or dromedar* or equine or coronary or coronal or covidence* covidien or influenza virus or bovine or calves or tgev or feline or porcine or erinaceus or bcov or ped or pedv or pdcov or fipv or fcov or canine or ccov zoonotic or avian influenza or h1n1 or h5n1 or h5n6 or ibv or murine corona*).mp.
11	or/8-10
12	11 and 20191201:20301231.(dt).

13	((home or "at home" or "door to door" or mail order* or amazon or self) adj4 or screen* or diagnos* or pcr or "rt-pcr" or "qt-pcr" or lamp or kit or kits or cc or sampl* or saliva* or nasal* or swab* or gargle or assay* or "single use" o disposable)).ti,ab,kw,kf.
14	(((self collected or self administered or patient collected or patient administe adj4 (test* or screen* or diagnos* or pcr or "rt-pcr" or "qt-pcr" or lamp or kit or sample* or saliva* or nasal* or swab* or gargle or assay*)) or patient sam or patient sampling).ti,ab,kw,kf.
15	(dxterity or rapidrona or coronadx or pathag or pathpod or pathlock or (labc adj2 pixel) or lucira).ti,ab,kw,kf.
16	or/13-15
17	12 and 16

#	Query
1	((TITLE-ABS-KEY (coronavirus* OR "corona virus*" OR oc43 OR nl63 229e OR hku1 OR hcov* OR ncov* OR covid* OR sarscov* OR sars OR "sars-coronavirus*" OR "severe acute respiratory syndrome coronavir) AND NOT (TITLE-ABS-KEY (camel* OR dromedar* OR equine OR coronary OR coronal OR covidence* OR covidien OR "influenza virus" bovine OR calves OR tgev OR feline OR porcine OR erinaceus OR OR ped OR pedv OR pdcov OR fipv OR fcov OR canine OR ccov zoonotic OR "avian influenza" OR h1n1 OR h5n1 OR h5n6 OR ibv O "murine corona*"))) OR ((TITLE-ABS-KEY ("2019-ncov" OR ncov19 "ncov-19" OR "sars-cov2" OR "sars-cov-2" OR sarscov2 OR "sarscov- OR sarscoronavirus2 OR "sars-coronavirus-2" OR "coronavirus-19" OR covid19 OR "covid-19" OR "covid 2019" OR "2019-novel cov" OR ((n OR new OR nouveau) W/2 (cov OR ncov OR covid OR coronavirus "corona virus" OR pandemic*)) OR (coronavirus* AND pneumonia))) AND (TITLE-ABS-KEY (camel* OR dromedar* OR equine OR coronar coronal OR covidence* OR covidien OR "influenza virus" OR bovine C calves OR tgev OR feline OR porcine OR erinaceus OR bcov OR pe OR pedv OR pdcov OR fipv OR fcov OR canine OR ccov OR zoonc OR "avian influenza" OR h1n1 OR h5n1 OR h5n6 OR ibv OR "murin corona*"))) AND (LIMIT-TO (PUBYEAR , 2021) OR LIMIT-TO (PUB , 2020) OR LIMIT-TO (PUBYEAR , 2019))
2	TITLE-ABS-KEY (((home OR "at home" OR "door to door" OR "mail o OR amazon OR self) W/4 (test* OR screen* OR diagnos* OR pcr C "rt-pcr" OR "qt-pcr" OR lamp OR kit OR kits OR collect* OR sample* saliva* OR nasal* OR swab* OR gargle OR assay* OR "single use" C disposable)) OR (("self collected" OR "self administered" OR "patient

	collected" OR "patient administered") W/4 (test* OR screen* OR diag OR pcr OR "rt-pcr" OR "qt-pcr" OR lamp OR kit OR kits OR sample saliva* OR nasal* OR swab* OR gargle OR assay*)) OR "self sampl OR "self sampling" OR "patient sampled" OR "patient sampling" OR dx OR rapidrona OR coronadx OR pathag OR pathpod OR pathlock OR labcorp W/2 pixel) OR lucira)
3	(#1 AND #2) AND NOT INDEX(medline)

1	"covid-19" "home testing"
2	"covid-19" "home sampling"
3	"covid-19" "home collection"
4	"covid-19" "home swab"
5	"covid-19" "self testing"
6	"covid-19" "self sampling"
7	"covid-19" "self collection"
8	"covid-19" "self swab"
9	"sars-cov-2" "home testing"
10	"sars-cov-2" "home sampling"
11	"sars-cov-2" "home collection"
12	"sars-cov-2" "home swab"
13	"sars-cov-2" "self testing"
14	"sars-cov-2" "self sampling"
15	"sars-cov-2" "self collection"
16	"sars-cov-2" "self swab"

#	Query
1	("2019-ncov" OR ncov19 OR "ncov-19" OR "sars-cov2" OR "sars-cov-2" OR sarscov2 OR "sarscov-2" OR sarscoronavirus2 OR "sars-coronavirus-2" OR "coronavirus-19" OR covid19 OR "covid-19" OR "covid 2019" OR "2019-nov cov" OR ((novel OR new OR nouveau) near/2 (cov OR ncov OR covid OR coronavirus* OR "corona virus" OR pandemic*)) OR (coronavirus* AND pneumonia)):ti,ab

2	(((home OR "at home" OR "door to door" OR "mail order*" OR amazon OR near/4 (test* OR screen* OR diagnos* OR pcr OR "rt-pcr" OR "qt-pcr" OR la OR kit OR kits OR collect* OR sample* OR saliva* OR nasal* OR swab* OR gargle OR assay* OR "single use" OR disposable)) OR (("self collected" OR administered" OR "patient collected" OR "patient administered") near/4 (test screen* OR diagnos* OR pcr OR "rt-pcr" OR "qt-pcr" OR lamp OR kit OR ki sample* OR saliva* OR nasal* OR swab* OR gargle OR assay*)) OR "self sampled" OR "self sampling" OR "patient sampled" OR "patient sampling" C dxterity OR rapidrona OR coronadx OR pathag OR pathpod OR pathlock O (labcorp near/2 pixel) OR lucira):ti,ab
3	#1 and #2

" "covid-19" | coronavirus | "sars-cov-2" " " home test | home screen | home diagnosis | home kit | home collect | home sample | home swab "
" "covid-19" | coronavirus | "sars-cov-2" " " self test | self collect | self sample | se administer | self swab "
" "covid-19" | coronavirus | "sars-cov-2" " " dxterity | rapidrona | coronadx | patha pathpod | pathlock | labcorp pixel | lucira "

Other Grey Literature Sources

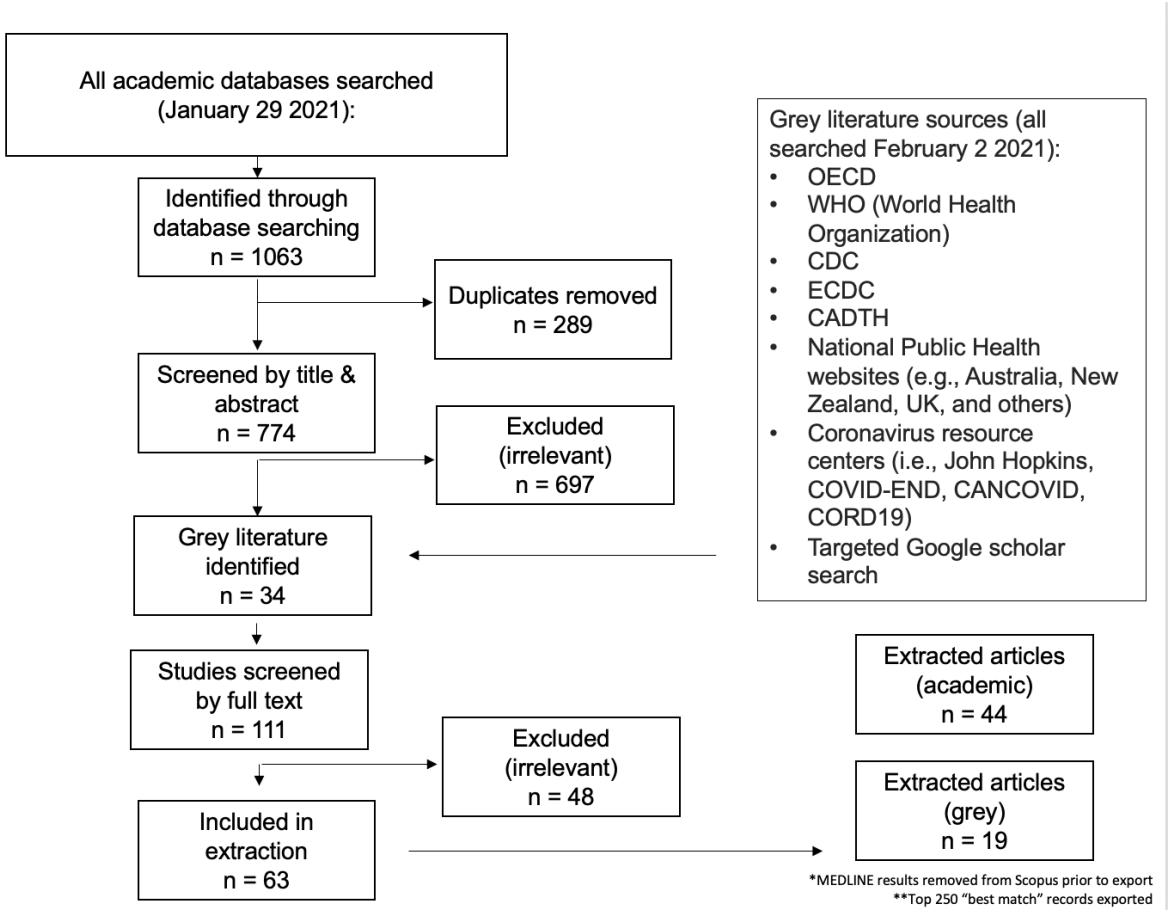
The following list of websites were searched for grey literature: OECD, WHO, CDC, ECDC, CADTH, National public health websites (e.g., Australia, UK, New Zealand, United States), Coronavirus resources (e.g., Johns Hopkins, COVID-END, CAN-COVID, CORD19).

Appendix B

Inclusion/exclusion criteria

Include/Exclude	Criteria
Include	COVID-19
Include	Population: All demographics and population subgroups eligible
Include	Self-administered test (setting is important but will not be an exclusion criteria) Results may be available immediately (i.e., rapid results) OR requires shipment to the laboratory for processing and/or interpretation of results (could also be uploading to computer - image or reading)
Include	Study design: Published and pre-print pieces for academic journals (social science, science, and medicine); Research articles (multiple designs not just randomized control trails should be within scope); Letters; Commentary/perspectives/editorials; Grey literature (e.g. government, non-profits, etc.)
Exclude	non-COVID-19
Exclude	Non-covid-19 related (not interested in at home tests that do not screen for COVID-19)
Exclude	Test administered solely by a trained health professional (including if HCP self-administers)

Appendix C


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

Appendix D: Annex

Author-year and reference	Journal/ source	Country	Source	Purpose	Type/ Design/population	Tests used/described in source	Test performance	Details on implementation/lessons learned
Aatresh et al 2020	medRxiv	United States	Preprint	To implement a fully remote seroprevalence study for SARS-CoV- 2, leveraging electronic methods and at-home self-collection of specimens to engage a representative study population.	Cross sectional Adult (18 years of age) residents of Massachusetts, with no requirements around prior or expected exposure to SARS-CoV-2 (n=2066 enrolled; n=1872 completed baseline data collection).	Serology Samples were mailed to a central laboratory for analysis.	None provided	Participants were shipped through the United States Postal Service (USPS) an at-home specimen collection kit. High engagement and positive feedback from participants.
Abdollahi et al (2020)	Iranian Journal of Pathology	Iran	Academic publication	To compare lab technician- with patient- collected oropharyngeal and nasopharyngeal samples for detection of COVID 19 using rRT-PCR.	Non-randomized experimental study Adults patients with flu-like symptoms, and with clinical and radiologic evidence of viral pneumonia. (n=50 participants)	Self-administered swabs. In this study, each patient had two sets of collected samples from nasopharyngeal and oropharyngeal swabs, one of each taken by patients (self-administered) and the other by a lab technician.	The overall percentage of agreement among both nasopharyngeal and oropharyngeal swabs taken by a lab technician and patients was 76% with a kappa value of 0.49 (P=0.001).	

Author-year and reference	Journal/ source	Country	Source	Purpose	Type/ Design/population	Tests used/described in source	Test performance	Details on implementation/lessons learned
Adenjii et al 2020	African Journal of Primary Care and Family Medicine	South Africa	Academic publication	To review different methods of collection of upper respiratory specimens and their efficacy.	Review	Self-collected swab	None reported. Cites previous work on self-collection of specimens.	Authors concluded that self-collected or parent-assisted nasal swabs were as good as trained staff-collected swabs. Authors subsequently recommended wide distribution of self-collection kits to all communities in South Africa, in the hope to improve testing rate and relieve the burden of swab collection on health professionals.
Astorino 2021	Media	United States	Media	Media article describing the best at-home tests available in the United States, after consulting with doctors on the topic.	Text and opinion	EmpowerDX Nasal Swab (PCR/molecular) LabCorp Pixel (PCR/Molecular) LetsGetChecked (PCR/Molecular) CRP Rapid Response (PCR/molecular) (saliva test) Vault Health (PCR/Molecular) (saliva) Everlywell (PCR/molecular) (nasal swab) DxTerity (saliva)	Claims from the article are described as follows: Empower DX Nasal Swab is “highly accurate” LabCorp Pixel (PCR/Molecular) “accuracy is under review by FDA”; repeat testing is harder to achieve than Empower DX Nasal swab CRP Rapid Response – less accurate when compared to other tests Vault Health (PCR/Molecular) (saliva) – accuracy of test is still under investigation. Everlywell (PCR/molecular) (nasal swab) – accuracy is still under investigation DxTerity (saliva) – accuracy is not confirmed	This media article details a variety of pros and cons. No further details on test accuracy are provided. Costs are also provided per test.

Author-year and reference	Journal/ source	Country	Source	Purpose	Type/ Design/population	Tests used/described in source	Test performance	Details on implementation/lessons learned
Atchison et al 2020	Clinical Infectious Diseases	UK	Academic publication	To examine self-administered SARS-CoV-2 antibody testing in the home setting to determine its usability and acceptability. Lateral flow immunoassays were the tests used.	Cross sectional design (n= 315 in pilot; 8754 of 10600 who received LFIA1 kits; 2957 of 3800 who received LFIA2 kits)	serological lateral flow immunoassays (LFIA).	Substantial concordance between participant and clinician interpreted results (kappa: LFIA1 0.72; LFIA2 0.89).	Impactful public involvement is feasible in a rapid response setting. Home self-testing with LFIAs can be used with a high degree of acceptability and usability by adults, making them a good option for use in seroprevalence surveys.
Basso et al 2020	medRxiv	Italy	Preprint	To compare in saliva specimens and NPS, the diagnostic accuracy of molecular testing with SARS-CoV-2 antigen detection by a rapid chemiluminescent assay and two different point of care ultra-rapid immunochromatographic assays.	Cross sectional design (n=234 participants)	Paired self-collected saliva (Salivette) and NPS were obtained to perform rRT-PCR chemiluminescent (Lumipulse G) and POC (NPS: Fujirebio and Abbott; saliva: Fujirebio) for SARS-CoV-2 antigen detection. Saliva was self-collected by the Salivette device and trained nurses collected three NPS from each patient.	The overall agreement between NPS and saliva rRT-PCR was 78.7%, reaching 91.7% at the first week from symptoms onset. SARS-CoV-2 CLEIA antigen was highly accurate in distinguishing between positive and negative NPS (ROC-AUC=0.939, 95%CI:0.903-0.977), with 81.6% sensitivity and 93.8% specificity. This assay on saliva had an overall good accuracy (ROC- AUC=0.805, 95%CI:0.740-0.870), reaching the optimal value within 7 days from symptom onset (Sensitivity: 72%; Specificity: 97%). POC antigen in saliva had a very limited sensitivity (13%), performing better in NPS (Sensitivity: 48% and 66%; Specificity: 100% and 99% for Espline and Abbott respectively), depending on viral loads.	Self-collected saliva is a valid alternative to NPS for SARS-CoV-2 detection not only by molecular, but also by CLEIA antigen testing (highest diagnostic accuracy was achieved in the first week from symptom onset). Authors concluded that saliva is not suitable for POC, although the accuracy of these tests appears satisfactory for NPS with high viral load.
Bien-Gund et al 2021	JAMA Network Open	United States	Academic publication	To explore the public's motivation to self-administer and distribute tests for COVID-19.	Cross sectional study (n=586 participants; recruited from Amazon's Mechanical Turk)	Not specified but participants were asked about willingness to use self-test kits, including those ordered online	n/a	Respondents were highly motivated to use self-test kits for COVID-19. Overall, 90% indicated that they would distribute such kits to their contacts if infected, 86% would accept such kits from infected contacts, and 83% would order online kits if needed.

Author-year and reference	Journal/ source	Country	Source	Purpose	Type/ Design/population	Tests used/described in source	Test performance	Details on implementation/lessons learned
Bragg et al 2021	Media	United States	Media article	Article describes vending machines that distribute home test kits for COVID-19	Text and opinion	RT-PCR (saliva based)	Claims that tests are 99% accurate.	Wellness 4 Humanity is the vending machine operator offering the testing for COVID-19. Vending machines are available in universities. There are plans to install 1000 vending machine. Tests will be purchased online and a barcode will be used to dispense the test kit from the vending machine. A drop of saliva is self procured and the vial is then dropped off at any FedEx location to be shipped to the company. Results are available in 24-48 hours.
Braz-Silva et al 2021	Journal of Oral Microbiology	Brazil	Academic publication	Examined the agreement between self-administered saliva swabs and nasal-oropharyngeal swabs for surveillance of COVID-19 via a telemedicine platform.	Cross sectional study (n=201 participants; symptomatic)	Combined nasal and oropharyngeal swab; Salivette saliva sampling	Agreement between combined nasal and oropharyngeal swab and saliva sampling was significant (kappa=0.58); sensitivity for combined swab was 74% and for saliva test was 79%.	The authors found that it is feasible to use self-administered tests, including those based on saliva, for the detection of COVID-19 infection in a home setting.
Brown et al 2020	medRxiv	UK	Preprint	Examined the feasibility of self-sampled capillary blood testing as a method for serological COVID-19 testing and compared it to results obtained from health care provider blood sampling.	Cross sectional (n=39 participants; n=18 serologically positive, n=21 negative)	Blood sampling using Microvette capillary tubes and run on COVID-19 IgG ELISA.	Agreement was very high between venous and capillary blood samples (kappa>0.88).	The authors found that self-administered capillary blood testing was feasible in determining COVID-19 serological status.
Corman et al 2020	medRxiv	Germany	Preprint	To compare seven antigen point of care tests	Comparative study of analytic sensitivity (Healthy volunteers, n=138 positive samples were used)	I: Abbott Panbio™ COVID-19 Ag Rapid Test; II. RapiGEN BIOCREDIT COVID-19 Ag; III: Healgen® 348 Coronavirus Ag Rapid Test Cassette (Swab); IV Coris Bioconcept Covid.19 Ag Respi-Strip; V: R-349 Biopharm RIDA®QUICK SARS-CoV-2 Antigen; VI NAL von minden; NADAL COVID19-Ag Test; VII: 350 Roche/SD Biosensor SARS-CoV Rapid Antigen Test	RapiGEN BIOCREDIT COVID-19: 4/45 were correct and test was terminated. All tests reported between 0 and 2 false positives out of 100 tests. The cumulative specificities from exclusivity testing as well as testing of healthy volunteers were: Abbott Panbio™ COVID-19 Ag Rapid Test (99.26%), RapiGEN (88.24%); Coris Bioconcept Covid.19 Ag Respi-Strip (100%); R-Biopharm RIDA®QUICK SARS-CoV-2 Antigen (94.85%); NAL von minden NADAL COVID19- Ag Test (99.26%); Roche/SD Biosensor SARS-CoV Rapid Antigen Test (98.53%).	The tests were self administered to collect samples but with a trained HC worker supervising. Authors emphasized the need to follow up any positive tests with a RT-PCR to confirm diagnosis.

Author-year and reference	Journal/ source	Country	Source	Purpose	Type/ Design/population	Tests used/described in source	Test performance	Details on implementation/lessons learned
Contify Life Science (2020)	Media	United States	Media	Contify Life Science News (2020) releases this media advisory to relay information provided by Ellume Health, that their at-home COVID-19 test has been submmited for Emergency Use Authorization (EUA) to the FDA.	Media	Ellume	Article states a clinical trial demonstrates the test has a sensitivity of 95% and a specificity of 97%.	None – FDA approved for at-home use.
Datametrex 2020	Media	United States	Media	Media article discusses COVID-19 testing stigma in Ireland from the perspective of GPs.	Text and opinion	RapiGEN Inc. ("RapiGEN") COVID-19 home test kits.	None provided.	This news report provides limited information on the RapiGEN Inc COVID-19 home test kits after its approval by FDA. No additional information is provided.
Davis et al 2020	medRxiv	UK	Preprint	To describe the prevalence of five potential indicators that will be of utility for ongoing COVID-19 cohort studies.	Cross sectional study (Staff and postgraduate students from King's College London, UK (n=1882 participants completed the baseline survey, consented to follow up and completed the antibody testing with a valid result)	Self-testing using IgG/IgM test kit based on "lateral flow".	Testing sensitivity and accuracy are reported elsewhere.	None.
Durden 2021	Media	United States	Media article	The article describes how transmission could be affected and decreased as a result of the tests.	Text and opinion	Both PCR and Ag testing mentioned.	Ellume test kids have 96% sensitivity. Lucira test kits have 94% sensitivity.	Durden mentioned how testing is becoming more available and more popular and is crucial to control the spread of the disease. Some tests require a prescription and others do not.

Author-year and reference	Journal/ source	Country	Source	Purpose	Type/ Design/population	Tests used/described in source	Test performance	Details on implementation/lessons learned
Goldfarb 2020	MedRxiv	Canada	Preprint	To assess the performance, stability and end-user acceptability of self-collected saliva and saline mouth-rinse or gargle sample types for molecular detection of coronavirus in both adults and school-aged children.	Cross sectional study 50 participants (age range of 4-71 years); 34 known positives and 16 symptomatic household contacts)	NPFS (flexible, flocked swabs w/ 3mL universal transport system media - Beckon Dickinson); Mouth/rinse gargle specimens - used 5mL sterile 0.9% saline (Addipak, Teleflex Medical) and then expelled saline into a 90mL Leakbuster container (Starplex Scientific). Saliva collection used the same containers (Leakbuster).	Mouth rinse/gargle samples were significantly more likely to be positive than saliva samples (difference of 18.7%; 95% CI 3.9-33.5%, p=0.01). When comparing matched samples, mouth rinse/gargle testing results differed statistically from saliva samples (26 positive by both, 6 rinse/gargle positive but saliva negative, 1 negative by both, McNemar p=0.03). Mouth rinse/gargle sample and saliva testing results were statistically similar to HCW-collected NPFS testing results. Sensitivity of mouth rinse/gargle (LDT)= 39/40 or 97.5%; 95% CI: 86.8-99.9); mouth rinse/gargle (Gx) = 38/39 or 97.4% (95% CI: 86.5-99.9); saliva (LDT) - 26/33 or 78.8% (95% CI: 61.0-91.0)	Mouth rinse/gargle samples were self-collected along with NPFS (HCW collected as per CDC protocol). All samples were immediately brought to the laboratory and processed within 12 hours of collection Participants rated acceptability of sample types - mouth rinse/gargle sample had highest acceptability (mean-4.95) and significantly more acceptable than HCW NPFS (mean-3.17) or saliva (4.44).
Hall 2020								
Hanson 2020	Journal of Clinical Microbiology	United States	Academic publication	To evaluate the performance of patient self-collected ANS and saliva versus that of health care provider-collected NPS for SARS-CoV-2 diagnostic testing	Non-randomised experimental study Adult patients presenting to a drive-through test center with symptoms suggestive of COVID-19 (n=368)	Hologic Aptima SARS-CoV-2transcription-mediated amplification (TMA) assay (Hologic Inc.) Sample collection: nasopharyngeal swab and self-collected anterior nasal swab	The percent positive agreement between NPS and ANS or saliva was 86.3% (95% confidence interval [CI], 76.7 to 92.9%) and 93.8% (95% CI, 86.0 to 97.9%), respectively. The percent negative agreement was 99.6% (95% CI, 98.0 to 100.0%) for NPS versus ANS and 97.8% (95% CI, 95.3 to 99.2%) for NPS versus saliva. More cases were detected by the use of NPS (n80) and saliva (n81) than by the use of ANS (n70), but no single specimen type detected all severe acute respiratory syndrome coronavirus2 (SARS-CoV-2) infections.	NPS and saliva were clinically superior to ANS alone for the detection of SARS-CoV-2 in symptomatic patients It is recommended that combination testing maybe aa better approach than single approach.

Author-year and reference	Journal/ source	Country	Source	Purpose	Type/ Design/population	Tests used/described in source	Test performance	Details on implementation/lessons learned
Hoehl et al. 2020	MedRxiv	Germany	Preprint	To evaluate the implementation of a high frequency, self-collected rapid antigen test performed by teachers for screening for positive COVID-19 infection. The primary objective was to determine if using the rapid antigen tests resulted in true-positive detection of COVID-19.	Cross sectional study Teachers from primary and secondary schools in Germany (n=602)	RIDA QUICK SARS-CoV-2 Antigen Test, R-Biopharm (lateral flow, rapid antigen test)	10836 tests recorded True positive: 5 of 602 participants (0.83% participants) False positive: 16 cases (in 10 instances, this occurred the first time the teacher took the test). False negative: assumed when positive test confirmed by medical professional (PCR) during time of high frequency testing (n=4 cases) *Only positive or suspected positive COVID-19 antigen tests were matched with a RT-PCR. 47 of 10836 tests (0.43%) yielded an invalid result.	Schools - teachers were screened on a frequent basis over the 7-week period of the study. Support is provided for those taking self-testing without medical or HCW supervision. In this instance, a hotline was provided for those who needed either technical support or medical support, or when an inconclusive result was found.
Impact News Service 2020	Media	United States	Media article	Announcement about vending machines for home tests	Text and opinion	UA-authorized rapid antigen and RT-PCR saliva tests	97.4 % accuracy 100% specificity	Automated testing is a convenient and safe way to test for COVID-19 in the comfort of your own home for one or multiple members of your household.
Kandel et al. 2021	Infection Control & Hospital Epidemiology	Canada	Academic Publication	To evaluate self-collected swab techniques for the detection of COVID-19 (saline gargle, oral swab and combined oral-anterior nasal swab) in three assessment centres across three study time periods.	Cross sectional study n=340 individuals tested positive for SARS-CoV-2.	Both oral swab and combined oral-anterior nasal swab used Miraclean Technology C. Ltd 93050 disposable flocked nasal, oral, throat swab. Saline gargle - 3mL of 0.9% NS.	False negative tests: 7/64 (11% - saline gargle); 11/55 (20% - oral swab); 6/40 (15% - combined oral-anterior nasal swab) Unadjusted sensitivity: NPS was above 90%; saline gargle:0.89 (95%CI: 0.79-0.96); oral swab: 0.80 (95%CI: 0.68-0.90) and combined oral-anterior nasal swab: 0.86 (95%CI: 0.71-0.95). When accounting for random sampling of negative specimens and fraction of those with a paired non-NPS swab - sensitivity of the NPS decreased and the self-collected non-NPS techniques rose to saline gargle: 0.90 (95%CI: 0.86-0.94); oral swab: 0.82 (95%CI: 0.72-0.89); and combined oral-anterior nasal swab: 0.87 (95%CI: 0.77-0.93). % agreement (kappa coefficient) between NPS and saline gargle: 0.99 (kappa CE: 0.93, 95%CI: 0.86-0.96); oral swab was 0.98 (kappa CE: 0.87, 95% CI: 0.79-0.92) and the oral-anterior nasal swab: 0.97 (kappa CE: 0.85, 95%CI:0.74-0.91)	HCW collected the NPS swab; self-collected swabs were completed with written instructions provided. Discordance between saline gargle and oral-anterior nasal swab were observed primarily for asymptomatic individuals with high Ct values for the E-gene, while oral swab was negative in both symptomatic and asymptomatic individuals.

Author-year and reference	Journal/ source	Country	Source	Purpose	Type/ Design/population	Tests used/described in source	Test performance	Details on implementation/lessons learned
Kojima 2020	MedRxiv	United States	Preprint	To compare specimen types and collection methods to explore if a simpler solution could expand testing access	Cohort Non-hospitalized persons who received testing for COVID-19 at a drive-through testing centre. Individuals with positive and negative results were included (n=45)	PCR testing. Self-collected oral fluid swab specimens, self-collected nasal swab specimens, nasopharyngeal swab specimens.	Clinician supervised oral fluid swab specimens detected 26 (90%) of 29 infected individuals. Clinician supervised nasal swab detected 23 (85%) of 27, clinician-collected posterior nasopharyngeal swab specimens detected 23 (79%) of 29, and unsupervised self-collected oral fluid swab detected 19 (66%) of 29. There was no difference in testing performance when comparing those with and without active symptoms.	Supervised self-collection may be a viable alternative to HCW collection of specimens. It may reduce the expense of trained personnel and PPE required for testing and it may prevent unnecessary COVID-19 contact for HCW.
Ku 2021	Journal of Infectious Diseases	Singapore	Academic Publication	To validate the use of buccal swabs and saliva specimens as alternative diagnostic tests for SARS-CoV-2.	Cross sectional study participants diagnosed with SARS- CoV-2 infection by NPS, between the ages of 21 and 80 years (n=42)	NPS, self-collected buccal swabs, and self- collected saliva specimens, in-house RT-PCR was performed on all specimens	Among the 42 participants, 73.8% (31/42) tested positive by any one of the three tests. With reference to NPS, the saliva test had PPA 66.7%, NPA 91.7%, and OA 69.0%; the buccal swab had PPA 56.7%, NPA 100%, and OA 73.8%. (p255)	Authors recommended primary screening be performed with a saliva test or buccal swab, with a negative test warranting a confirmatory NPS. Even though the samples were self-collected, they were still conducted in the context of a healthcare setting and under the supervision of a healthcare worker.
Liao 2020	Advanced Biosystems	Taiwan	Academic publication	Reviews home-based, self-collection kits for COVID-19 detection that had been approved for emergency use authorization by the FDA (presumed to be Taiwan FDA) at the time of publication. Two tests (manufactured by several companies) have been approved with EUA. The article also refers to at-home test kits provided by companies in the UK (that appear eligible for use in Taiwan).	Commentary	The FDA has issued EUA to two COVID-19 home tests developed by LabCorp, Everlywell, Quest Diagnostics, PrivaPath Diagnostics10 and Clinical Reference Laboratory.	Although laboratory validations of self-collected samples have shown reasonable concordance with healthcare staff collection, it is not clear whether these home-based self-collection kits are of value for COVID-19 screening as specificity and sensitivity for SARS-CoV-2 has not been systemically reported In the USA, a total of 185 participants were enrolled; compared with the clinician swab, the sensitivity and speci city of the home swab were 80.0% (95% CI, 63–91%) and 97.9% (95% CI, 94–99.5%), respectively.	

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Lindner 2021	MedRxiv	Germany	Preprint	To establish a head-to-head comparison of diagnostic accuracy, user- acceptability and feasibility of Ag-RDT self-testing with Ag-RDT professional testing and RT-PCR.	Cross sectional study Patients at the ambulatory SARS-CoV-2 testing facility of Charité - Universitätsmedizin Berlin, Germany who were suspected of SARS-CoV-2 infection based on symptoms or close contact with a confirmed case and any symptom (n=146)	STANDARD Q COVID-19 Ag Test (SD Biosensor, Inc. Gyeonggi-do, Korea)	Sensitivity with self- testing was 82.5% (33/40 RT-PCR positives detected; 95% CI 68.1-91.3), and 85.0% (34/40; 95% CI 70.9- 92.9) with professional testing. The positive percent agreement between self-testing and professional testing on Ag-RDT was 91.4% (95% CI 77.6-97.0), and negative percent agreement 99.1% (95% CI 95.0- 100). At high viral load (>7.0 log10 SARS-CoV-2 RNA copies/ml), sensitivity was 96.6% (28/29; 95% CI 82.8-99.8) for both self- and professional testing.	Self- testing with Ag-RDTs could not only alleviate overstretched RT-PCR capacity and medical personnel, but also may result in increased access to frequent testing and significant impact on the pandemic. p14
Lopez-Lopes 2020	MedRxiv	Brazil	Preprint	To test the feasibility of using samples pooling offering different collection alternatives (swab, throat wash, salivia) to volunteers of a public health institute	Non-randomized experimental study Asymptomatic healthcare workers	The reconstituted pools were prepared from frozen samples on previously tested individuals obtained by nasophayngeal swab or throat wash. Prospective pools were collected from throat wash plus saliva collection. Standard nasopharyngeal swab was obtained from a set of volunteers for comparison.	Pool CT was generally higher than individual samples. Lucigen extraction showed higher thresholds (CT) including false negative results from samples with high CT at Qiagen extraction. Paired swab and throat wash samples showed comparable results.	
McCarthy 2021	Expert Review of Molecular Diagnostics	United States	Academic Publication	Provides a general overview of the first United States FDA-approved at-home rapid SARS-CoV-2 assay and LAMP technology in general for it's applicability to addressing the COVID-19 pandemic. (The test referred to in this editorial is the All-in-One Test Kit - Lucira Health, which relies on LAMP for detection and was approved on November 17 2020).	Commentary Editorial applied to the general US population.	Rapid LAMP - results are available within 30 minutes.	Referring to the FDA comparator test, the article states that Lucira's at-home test kit achieved a "94% positive percent agreement and a 98% negative percent agreement with the FDA's comparator test".	Article further states that more information is needed for LAMP's performance in a variety of settings: outpatient clinics, points of entry, airports. A limitation of current diagnostics over at-home testing is that they are unable to be done as frequently. This editorial quotes other scientists (Michael Mina and colleagues) by posing the key question of how effectively can we identify potential positive cases within a population as part of an overall, repeated testing strategy. LAMP technology may prove useful in this regard.

Author-year and reference	Journal/ source	Country	Source	Purpose	Type/ Design/population	Tests used/described in source	Test performance	Details on implementation/lessons learned
McCulloch 2020	JAMA	United States	Academic Publication	The purpose of this study was to compare unsupervised home self-collected swabs with clinician-collected nasopharyngeal swabs for COVID-19 diagnosis	Cross sectional study Study participants were recruited from symptomatic outpatients testing severe acute respiratory syndrome coronavirus 2(SARS-CoV-2)–positive and symptomatic health care workers presenting to drive-through clinics	Comparison of unsupervised home self-collected midnasal swabs with clinician-collected nasopharyngeal swabs for detection of SARS-CoV-2 infection	Compared with clinician swabs, sensitivity and specificity of home swabs was 80.0% (95% CI, 63%-91%) and 97.9% (95% CI,94%-99.5%), respectively (Table). Cohen κ statistic was 0.81 (95% CI, 0.70-0.93), suggesting substantial agreement	Unsupervised home midnasal swab collection was comparable to clinician-collected nasopharyngeal swab collection for detection of SARS-CoV-2 in symptomatic patients, particularly those with high viral loads.
McDermott 2020	Proc Natl Acad Sci U S A	United States	Academic Publication	Article that describes the focus on developing in-home COVID-19 testing options. Provides an overview of the potential for these tests to support the COVID-19 response.	Commentary General Population	Tests are generally described in this article. This include: 1) SalivaDirect (awarded an emergency use authorization in August) - still requires laboratory processing but it is 1-3 hours faster than PCR (unclear if this test is self-collected, at home); 2) LAMP; 3) CRISPR-based tests.	Both LAMP and CRISPR are noted within the article to be promising candidates for in-home testing. Antigen tests are faster and less costly to nucleic acid tests but less sensitive, in particular, when a person has a low level of infection. However, they do reliably detect COVID-19 at peak viral load (when person is most contagious). Other tests described include the E25bio (paper-based antigen strip); results in 15 minutes. Other tests in development for in-home, public use (at the time of the article) - CRISPR-based tests	N/A
Mertz 2020	IEEE Engineering in Medicine & Biology Society	United States	Media	To describe the process and potential of Scanwell's Health test Innovita.	Other: News	Scanwell's Health test Innovita.	The test is a blood prick that goes into a cassette and is able to be scanned by a phone app. The app sends results to a lab where it is interpreted and feedback is provided to the patient.	N/A

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Moisset 2021	European Journal of Pain.	United States	Academic publication	To compare swabbing-induced pain with the two methods. Secondary objectives focused on swabbing-induced discomfort and acceptability of each technique.	Randomised controlled trial Fourth- and fifth-year medical students from Clermont-Ferrand	trained swabbing vs self-administered (but supervised) swabbing	Median pain level was low (2 [1–4]; range from 0 to 8), without significant difference between the two groups (p = .21; |d| = 0.18). Significant pain was reported by 28.4% of subjects in each group. Discomfort was more intense (median 5 [3–6]; range from 0 to 10), 66.3% of subjects indicating a significant level of discomfort. Again, there was no significant difference between groups. In total, acceptability was excellent for 89.0% of the subjects (median 10 [8–10]. In conclusion, nasopharyngeal swabbing can be described as more uncomfortable than it is painful and the two techniques that can be proposed (conventional swabbing by a trained healthcare	Moisset (2021) analyzed the comfort level of trained swabbing vs self administered (but supervised) swabbing. THey did not find any difference in discomfort level between the two procedures. Overall, the median pain level was low (2), signifcant pain was felt in 28.4% .
Nagura-Ikeda 2020	Journal of clinical microbiology	Japan	Academic publication	To describe the clinical performance of various molecular diagnostic methods, including the RT-qPCR LDT, the cobas SARS-CoV-2 high-throughput system, 3 directRT-qPCR kits, and RT-LAMP, and a commercial SARS-CoV-2 RAT used on self-collected saliva specimens in diagnosing COVID-19	Diagnostic test accuracy study 103 patients with COVID-19 were enrolled after being referred to the Self-Defense Forces Central Hospital in Japan for isolation and treatment under the Infectious Disease Control Law in effect from 11 February to 13 May 2020	RT-qPCR LDT using the standard protocol and RT-qPCR methods without RNA extraction, automated RT-qPCR device, RT-LAMP, and rapid antigen test	Among the molecular diagnostic tests, the RT-qPCR LDT showed the highest sensitivity in analyzing the 103 saliva samples (81.6%), followed in order by the cobas SARS-CoV-2test (80.6%), direct RT-qPCR method B (78.6%), method A (76.7%), RT-LAMP (70.9%), and method C (50.5%). Only 12 patients (11.7%) tested positive using the RAT.	Not described
Online 2020	Media	UK	Media	To report on test results waiting times of at home tests	Text and Opinion	Home testing (wait times)	Fewer than one in 10 people (7%) got a test result within 24 hours of taking a home test, while 15% got a result within 24 to 48 hours	Getting test results within 24 hours for home tests that are mailed in is very unlikely

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Pawlowski 2021	NBC News	United States	Media	To describe several at-home tests that are or will soon be available to consumers in the United States	Text and opinion	Binax NOW COVID-19 Ag Card Home Test, Ellume Covid-19 Home Test and Lucira COVID-19 All-In-One Test Kit	Binax: The test correctly identified 91.7% of positive samples and 100% of negative samples in people with symptoms, but Abbott said results from four investigational sites are still being analyzed; Ellume: The test correctly identified 96% of positive samples and 100% of negative samples in people with symptoms, the FDA said. In people who are not symptomatic, the test correctly identified 91% of positive samples and 96% of negative samples; Lucira: The test correctly identified 94% of positive samples and 98% of negative samples when compared to the results of a high-sensitivity test, the company said	Not described
PRNewswire 2020	CISION PR Newswire	United States	Media	To describe Baylor Genetics accessible and reliable at-home collection kit for COVID-19	Press Release	Baylor Genetics' at-home test kit	Baylor Genetics has one of the highest sensitivity (true positive) and specificity (true negative) rates for identifying an active coronavirus infection for its COVID-19 test	Not described
Riley 2020	medRxiv.	UK	Academic publication	Through the REal-time Assessment of Community Transmission-1 (REACT-1) study of English residents, Riley et al (2020) aim to describe community prevalence of SARS-CoV-2. This paper describes the interim results from the sixth study iteration	Cross sectional study English residents randomly selected from NHS general practitioner lists	Mailed self-administered swab kit that was refrigerated by the participants until pick up; PCR tested at lab	Not Described	Not described

Author-year and reference	Journal/ source	Country	Source	Purpose	Type/ Design/population	Tests used/described in source	Test performance	Details on implementation/lessons learned
Riley 2020	medRxiv.	UK	Academic publication	Through the REal-time Assessment of Community Transmission-1 (REACT-1) study of English residents, Riley et al (2020) aim to describe community prevalence of SARS-CoV-2. This paper describes the updates results from the fifth study iteration	Cross sectional study English residents randomly selected from NHS general practitioner lists	Mailed self-administered swab kit that was refrigerated by the participants until pick up; PCR tested at lab	Not Described	Not described
Riley 2020	medRxiv	UK	Academic publication	To assess the travel time to testing sites to determine their geographic accessibility in the United States, specifically focusing on travel time under and over 20 minutes.	Cross sectional study English residents randomly selected from NHS general practitioner lists	Mailed self-administered swab kit that was refrigerated by the participants until pick up; PCR tested at lab	Not Described	Not described
Riley 2020	medRxiv	UK	Academic publication	To assess the travel time to testing sites to determine their geographic accessibility in the United States, specifically focusing on travel time under and over 20 minutes.	Cross sectional study English residents randomly selected from NHS general practitioner lists	Mailed self-administered swab kit that was refrigerated by the participants until pick up; PCR tested at lab	Not Described	Not described
Rizzo 2021	Media	United States	Media	To provide knowledge about the vending machines that provide COVID-19 self tests	News	Vending machine tests in airports	To purchase a test, customers are required to pay online at W4Humanity.com. They will then be emailed a QR code that they'll scan at the machine. After taking the test at home, they'll ship the test with their saliva sample to a lab via FedEx and receive their results via the company's mobile app within 48 hours of the time the sample arrives at the lab.	N/A

Author-year and reference	Journal/ source	Country	Source	Purpose	Type/ Design/population	Tests used/described in source	Test performance	Details on implementation/lessons learned
Seaver 2021	Media	United States	Media	Not described	Text and opinion	Antigen tests (Binax, Ellume); RT-PCR (CRL Rapid Response DxTerity, Everlywell, LetsGetChecked, Vault, Phosphorus, Pixel by LabCorp); Molecular real-time loop mediated amplification reaction test (Lucira)	Tests have comparable efficacy rates and that some need to be analyzed at a lab while 3 can be analyzed right at home for fast results.	At-home testing has potential to make screening for coronavirus as convenient and available as possible, and at-home testing kits appear to be as good as on-site tests at detecting CoV-2 virus.
Services 2020	GlobalNewswire	United States	Media	Not described	Text and opinion	RapiGEN Inc. ("RapiGEN") COVID-19 home test kits	Suitable for point of care testing, no extra equipment is needed, and are easy to use with results in 5-10 minutes.If the specimen contains IgM antibodies to SARS-CoV-2, a colored line appears in the T line area. The RapiGen home test kit is a lateral flow immunochromatographic assay (LFIA) for the qualitative detection of IgG antibodies to COVID19 in blood, serum or plasma specimens	Very limited information in this news report.
Shakir 2020	Journal of Clinical Microbiology	United States	Academic Publication	The authors aimed to evaluate the use of oropharyngeal and anterior nares swabs that were self-administered versus nasopharyngeal swabs that were health care provider collected at a drive-through assessment centre in the United States	Cohort study Adults attending a drive-through COVID assessment centre	Self-collected anterior nares swab; self-collected oropharyngeal swab; standard nasopharyngeal swab (health care provider administered)	98.8% qualitative agreement between self-collected dual oropharyngeal and anterior nares swabs and health care provider collected nasopharyngeal swab; percent positivity was higher for health care provider collected nasopharyngeal swab at 27.7% as opposed to 27.0% for self-collected dual swabs (not statistically significant, p=0.88)	Shakir et al (2021) found that when the results of the self-collected and health care provider collected swabs were compared, there were no statistically significant differences in test positivity. However, four of the 423 patients were identified as positive on the health care provider administered test alone, while one patient was identified on the self-collected test alone
Siegler 2020	Oxford University Press.	United States	Academic publication	To assess patient willingness to use the following SARS-CoV-2 testing modalities for clinical care: home-based specimen collection, drive-through testing, and clinic-based testing	Survey US citizens 18+	Not described	Home specimen saliva testing was the most preferred (92%) followed by home throat swab (88%).	Not described

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Stella 2021	Media	United States	Media	To see just how useful the test is, and if it's worth the effort, I decided to purchase one for myself. I wasn't experiencing any COVID-19 symptoms at the time of the order or when I took the test, but it was still interesting to see exactly how the process worked and, ultimately, if it's a worthy alternative to waiting in line at my local CityMD.	Text and opinion	DxTerity COVID-19 Test	Here's how the test fared across both groups, according to DxTerity: With symptoms: Correctly identified 36 of 37 positive samples (97.3%) and 36 of 40 negative samples (90%) Without symptoms: Correctly identified 22 of 26 positive samples (84.6%) and 513 of 518 negative samples (99%)	Pros: Readily available via Amazon, easy to use, comes pre-packaged with a return shipping label already attached to the box Cons: Requires an up-front, out-of-pocket payment of $110, not guaranteed to be reimbursable via insurance, concerns over how accurately it identifies positive samples (especially in those without COVID-19 symptoms)
Tan 2020		Singapore	Preprint	To compare the accuracy of samples for SARS-CoV-2 collected by HCW (swab) with samples collected through self-collection (saliva and OPMT).	Diagnostic test accuracy study Group 1: Inpatients with confirmed COVID-19 (diagnosed with RT-PCR) admitted to either Changi General Hospital or a community care facility in Singapore (Community Care Facility @ EXPO). Group 2: Asymptomatic, community-dwelling participants with no known exposure to COVID-19.	OPMT (both self-collected and HCW-collected), self-collected saliva sample	Group 1: Detection rates of the HCW swab (83.8%, 95%CI:79.8-87.3, n=336), self-swab (75.1%, 95%CI:70.1-79.2, n=301), saliva (74.3%, 95%CI: 69.7-78.5, n=297) and combined self-swab + saliva (86.5%, 95%CI: 82.8-89.7, n=347). Compared with the HCW, sensitivities for the self-swab was 83.6%, saliva: 80.6% and combined self-swab + saliva (92.3%). The authors also observed that the sensitivity of self-swab and saliva testing performed better at the lower Ct values, suggesting that the sensitivity of self-collection methods is comparable to that of HCW swab, when the viral load of the participant was higher. Group 2: n=100 healthy volunteers provided the 3 samples; all tested negative for SARS-CoV-2.This implies that the specificity of the self-swab and saliva sampling was 100% (95% CI 96.4% to 100%) with an error rate of 3.6% for having a false negative.	Clear instructions were provided; however, participants still needed support with self-collection methods. Breaking the swab stick was challenging and the saliva sampling was difficult (flowing saliva into the container and then adding the stabilizing fluid required prompting). Trained staff were onsite to make sure the steps were carried out. Both collection methods required some level of dexterity which may limit their widespread use. The authors furthered cautioned against the use of self-collected methods without oversight by a trained person or HCW. There may be motivation for someone to influence the test result and provide a less than optimal test if other external drivers depend on having a negative swab.
Taylor-Phillips 2020	BMJ	UK and USA	Academic Publication	This study aims to explore online websites selling at-home self-sampling and testing kits for COVID-19, specifically exploring the completeness, accuracy and information on tests provided by these websites.	Cross sectional study Websites selling both at-home sampling and at-home testing kits for COVID-19 in both the UK and the USA were included. The distinction between at home sampling and at home testing is that samples are sent to laboratories for professional analysis and interpretation.	Molecular testing kits or antibody testing kits for at home sampling and/or testing.	Many websites failed to provide information on the accuracy of the tests (no information for 12/41 tests) and how to interpret results (no information for 21/41 tests).	Not described

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Teo 2020	medRxiv.	Singapore	Academic Publication	The study aimed to test the sensitivity of both "naso-oropharyngeal" saliva and self-administered nasal (SN) swabs compared with NP swabs in a cohort of migrant workers.	Diagnostic test accuracy study Participants were recruited from both a large dormitory where migrant workers are housed and a community care facility (CCF) where migrant workers who are diagnosed with COVID-19 (but do not require acute care) are monitored and isolating. All CCF participants were COVID-19+, while those recruited from the dormitory were: 1) presenting with symptoms of acute respiratory infection (ARI); 2) asymptomatic roommates of newly diagnosed COVID-19 cases.	RT-PCR testing (reference); saliva (naso-oropharyngeal); self-administered nasal swabs	n=337 sets of tests [n=150 (44.5%) positive NP swabs, n=127 (37.7%) positive SN swabs tested with CDC-LDT, n=119 (35.3%) positive SN swabs tested via Fortitude 2.1; n=209 (62.0%) positive saliva tested via CDC-LDT and n=167 (49.6%) tested positive with Fortitude 2.1. For 63 positive NP swabs with low Ct values (<30): SN swabs were concomitantly positive in 57 (90.5%, CDC-LDT) and 60 (95.2%, Fortitude 2.1) samples. Saliva was positive in 62 (98.4%, CDC-LDT) and 61 (96.8%, Fortitude 2.1). For the 87 swabs with Ct values >= 30, there was less concordance. SN swabs were positive in 49 (56.3%, CDC-LDT) and 48 (55.2%, Fortitude 2.1) samples. Saliva was positive in 77 (88.5%, CDC-LDT) and 64 (73.6%, Fortitude 2.1) samples. Test concordance between different sample types (kappa's coefficient) : 0.616 (NP and SN swabs tested via CDC-LDT, agreement of 81.3%; 0.675 for NP tested by CDC-LDT and SN swabs tested via Fortitude 21 (agreement of 84.3%), 0.5367 for NP and saliva tested via CDC-LDT (76.2% agreement) and 0.602 for NP tested via CDC-LDT and saliva tested via Fortitude 2.1 (80.1% agreement). Test concordances were excellent between two saliva (87.2%) and SN swabs tests (91.0% tests) - kappa coefficient of 0.745 and 0.806, respectively.	Not described
Therchilsen 2020	MPDI - Diagnostics	Denmark	Academic Publication	The aim of this study was to explore the correlation and diagnostic sensitivity of a simple low-cost technique for self-collected samples as an alternative to the more burdensome method based on HCW-collected samples in the diagnosis ofSARS-CoV-2 in symptomatic individuals	Cross sectional study COVID-19 outpatient testing facility at Copenhagen University Hospital Rigshospitalet, Denmark. Persons were referred by a general practitioner because of mild symptoms compatible with COVID-19, for screening prior to an outpatient appointment, or in relation to a planned hospital admission	oropharyngeal and lower nasal samples with the use of a single swab for SARS-CoV-2 testing. Samples were analyzed using the real-time reverse-transcription polymerase chain reaction (rRT-PCR) assay	The proportion of SARS-CoV-2-positive samples was16/109 (14.7%) for the self-collected samples in comparison to 17/109 (15.6%) for the HCW-collected samples. Cohens kappa 0.82,p<0.001, demonstrated an acceptable agreement between HCW collected swab and self admin. There were no significant difference in diagnostic sensitivity for the self-collected and HCW-collected samples, corresponding to 84.2% and 89.5%, respectively, p=0.81.However, of the 19 positive samples, only 14 (74%) were found positive by both tests	Not described

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Tonen-Wolyec 2020	PloS one	France	Academic Publication	to assess whether a self-administered capillary whole-blood IgG-IgM test could be used by the general public as a serological screening tool for SARS-CoV-2	Cross sectional study Residents of Strasbourg, France, recruited via door-to-door sampling	Exacto COVID-19 self-test (prototype capillary whole-blood IgG/IgM SARS-CoV-2 self-test)	there was high acceptability and usability of the self-administered serological screening tool, particularly among individuals with higher educational backgrounds	The pilot study indicated that among volunteer participants, the screening tool was used appropriately by the participants and the majority were able to self-administer it with no help and interpret the results (1.5% misinterpreted results)
Torjesen 2020	BMJ	UK	Academic Publication	This article is a commentary on the population study that is currently underway.	Commentary The population that was asked to take nose and throat swabs will be tested for active covid-19 infection and will be selected randomly from England. There individuals (100,000) will be tested using the antigen test and will be sent self-sampling kits.	3 separate testing strategies that are currently underway in the UK in different sectors, the general population being mailed self-kits, healthcare workers being targeted for antibody testing and National Health Service staff who had been already tested	Results form these studies are not available yet, though the result swill inform future testing strategies.	Not described
Trobajo-Sanmartin 2021	Journal of clinical medicine	Spain	Academic publication	This study aims to evaluate the utility of saliva samples for the diagnosis of SARS-CoV-2 infection and identify under what conditions a saliva sample could be useful.	Diagnostic test accuracy study Primary healthcare patients suspected of SARS-CoV-2 infection	Saliva samples were processed using the STARMag 964 universal extraction system and AllplexTM2019-nCoV assay (Seegene, Seoul, Korea) for the RT-qPCR, following the manufacturer's instructions. Nasopharyngeal samples were processed with two different methods, 552 samples were extracted using the STARMag 964 universal extraction system (Seegene, Seoul, Korea) with the Hamilton Microlab STARlet automation robot (Hamilton Company, Reno, NV,USA) and then RT-qPCR was performed using the AllplexTM2019-nCoV assay (Seegene, Seoul, Korea) on the CFX96 real-time PCR detection system (Bio-Rad, Hercules, CA, USA) following the manufacturer's instructions. The remaining 122 samples were analyzed on the Cobas®6800 platform (Roche Diagnostics GmbH, Mannheim, Germany) following the manufacturer's instructions. Although we used two different PCR kits (subject tolaboratory and commercial stock availability), both methods detect the ESARS-CoV-2 gene.	One out of two NP positives was detected with saliva samples. Excluding invalid results, the sensitivity and specificity for saliva samples were 51.9% (95% CI: 46.3%–57.4%)and 99.1% (95% CI: 97.4%–99.8%), respectively. Including invalid results in saliva samples, the sensitivity values were similar, indicating that these data exclusions would not significantly influence the outcome. The concordance rate between the two samples was75% (= 0.50; 95%CI: 0.45–0.56). Virus detection (sensitivity) in samples with Ct30 was 91.6% (95% CI: 85.7%–95.6%); however, in the samples with Ct > 30 it was 20.0% (95% CI: 14.4%–26.6%) (p< 0.001).	Difficulties in the correct NP swab collection

Author-year and reference	Journal/ source	Country	Source	Purpose	Type/ Design/population	Tests used/described in source	Test performance	Details on implementation/lessons learned
Valentine-Graves 2020	PloS one	United States	Academic publication	Not described	Not described Participants were identified through an Emory University database of individuals willing to be contacted for studies	Saliva, oropharyngeal swabs and dried blood spots	there was high acceptance for the use of shipped diagnostic self-tests (greater than 84%) and high confidence in the accuracy of specimen collection (87%) with no statistically significant differences in results by type of specimen or demographic characteristics (age, gender, education, race/ethnicity)	Not described
Ward 2020	MedRxiv.	UK	Academic publication	We aimed to i) estimate the cumulative community prevalence of IgG antibodies for SARS-CoV-2 from a large representative sample in England up to early July 2020, ii) identify those at most risk of infection, and iii) estimate the total number of infected individuals in England as well as the infection fatality ratio (IFR)	Prevalence study Personalized invitation were sent to 315, 000 individuals aged 18 years and above to achieve similar numbers in each of 315 lower-tier local authority areas	LFIA (Fortness Diagnostics, Northern Ireland)	N/A	Not described
Wehrhahn 2020	Journal of Clinical Virology	Australia	Academic publication	to compare self administered and healthcare provider administered COVID tests. Tests included nasal swabs, throat swabs, and combined throat and nasopharyngeal tests.	Prospective study Members of the public who presented to two lab sites in Australia for COVID testing during one week in March 2020 were included in the study. No other restrictions were in place for participation. Participants ages ranged from 9-81 years (median: 40 years), and 60% (n=142) were female.	"Self-collection kits included two swab packets each containing a single swab and screw-top container with 2 mL liquid Amies medium, a tongue depressor and a zip lock sample bag."	25 participants tested positive for COVID during the study period. From the self administered tests, 100% cases identified (25/25) were detected by the self test and 96% (24/25 cases) were identified from the healthcare provider-administered swab.	Not described
Willard 2020	Media	US	Magazine article	to discuss the launch of a COVID testing vending machines in five major US cities. The vending machines will dispense home COVID testing kits.	Magazine article	rapid antigen and RT-PCR saliva tests	rapid antigen testing: " has 97.4% accuracy and 100% specificity, meaning false negatives are unlikely" RT-PCR saliva tests are 99% accurate.	Not described

Author-year and reference	Journal/ source	Country	Source	Purpose	Type/ Design/population	Tests used/described in source	Test performance	Details on implementation/lessons learned
Wilson 2020	Journal of Community Genetics		Academic publication	discusses lags in COVID-19 testing and test distribution in the United States, how companies are attempting to address the gap in testing and making testing safe for everyone. Following this discussion, the home-based COVID tests are compared to similar genetic tests on the market.	Commentary	N/A	N/A	As home-based tests are still under development at the time of publication, the authors point that the tests need to focus on relieving strain on health systems and not create further burdens for healthcare providers. The authors also note that test results should be incorporated into the patient's health records and that developed tests need to be sensitive and specific to be effective in controlling the transmission of the virus.
Worldwide 2020	Pharma & Healthcare Monitor Worldwide	UK	magazine article	outlines the new home testing kit option which was designed by three universities in the UK. The device and testing is discussed and hopes for the product to be approved by appropriate agencies in the USA, UK and Europe.	magazine article	The COVID testing device uses nasal or throat swabs which can be placed in the device and synced with a SmartPhone to provide results in 20 minutes.		The article by Global Data Point (2020) provides a brief and general overview of a newly developed COVID testing device. The potential impacts it could have on the public and health systems are discussed- to support people knowing their COVID-19 status and prevent further community transmission of the virus.
Zimba 2020	Medrxiv.	US	Academic Publication	to determine factors which support the decision to get a COVID test and preferences for testing (test type, where test occurs, turnaround time for results).	A discrete choice experiment embedded within an existing cohort study Participants from a COVID cohort study. The initial cohort included 5098 participants and 4793 completed the survey associated with this study	For specimen collection type, participants primarily preferred cheek or spit swabs (42% each).		