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Rapid Diagnostic Testing for COVID-19 in a fully vaccinated population

Rapid systematic review

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Third-Party Materials

Not applicable.

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Abbreviations and Definitions

Abbreviations

RDT = rapid diagnostic testing

VOC = variant of concern

Key Definitions:

Rapid diagnostic testing – refers to point of care testing.

Fully vaccinated – refers to individuals who have received complete dosage of given vaccine.

Fully vaccinated population – refers to a certain percent of the population that has been fully vaccinated as the population moves towards herd immunity; here we defined this as 70% of the population.



EXECUTIVE SUMMARY

Introduction

The purpose of this study was to provide evidence on rapid diagnostic testing (RDT) for COVID-19 in a fully vaccinated population. This project sought to identify emerging evidence on how testing policies should be modified for those who have been fully vaccinated and also sought to identify evidence on social and economic considerations in this context. This work was commissioned by Health Canada through the SPOR Evidence Alliance.

Research questions

1. What scientific evidence exists and what international guidance exists on the use and effectiveness of RDT for SARS-CoV-2 and its variants of concern (VOC) in a fully vaccinated population?
2. What evidence exists on the social and economic considerations for RDT for SARS-CoV-2 in a fully vaccinated population?

Design

A rapid systematic review was conducted.

Methods

Using the multifile option and deduplication tool available on the OVID platform, we searched Ovid MEDLINE®ALL, including Epub Ahead of Print, In-Process & Other Non-Indexed Citations, and Embase+Embase Classic. We also searched the Cochrane Library (Database of Systematic Reviews, CENTRAL) on Wiley, the Web of Science Core Collection, the L-OVE Platform, COVID-END, ClinicalTrials.gov (COVID-19), and the WHO Covid-19 database.

We performed all searches on June 14, 2021, except for those in ClinicalTrials.gov and the WHO database, which were performed on June 15, 2021. Both empirical and modeling studies were included from 2020-2021. No language restrictions were applied. Four team members carried out the initial title and abstract screen (single reviewer screening) following a calibration exercise and then one team member undertook the full study data extraction (with quality assessment conducted by two team members). In addition, grey literature was searched through McMaster Plus, Google and the CADTH COVID-19 Evidence platform. Finally, key country websites were searched.

Five public members were engaged at the early stages of this project, four from BC and one from Alberta. Two content experts agreed to collaborate and provide help with interpretation of findings.

Summary of key findings

<p>WHAT SCIENTIFIC EVIDENCE EXISTS ON THE USE AND EFFECTIVENESS OF RDT IN FULLY VACCINATED POPULATIONS?</p>	<ul style="list-style-type: none"> • Three studies were identified as directly relevant to the research questions in our review - each reported on the development and validation of a SARS-CoV-2 test which purportedly could be used, in high throughput and low bio-safety contexts, to assess immunity status in a vaccinated population • None of the studies addressed social or economic impacts of testing in a fully vaccinated population; nor did they directly address issues of implementation or scalability • Overall quality of reporting was moderate, though each study also presents possible conflicts of interest to be considered
<p>WHAT INTERNATIONAL GUIDANCE EXISTS ON THE USE AND EFFECTIVENESS OF RDT IN FULLY VACCINATED POPULATIONS?</p>	<ul style="list-style-type: none"> • Websites for 18 countries were reviewed including those with populations most highly vaccinated; no clear international guidance was identified on this issue.
<p>WHAT EVIDENCE EXISTS ON SOCIAL AND ECONOMIC CONSIDERATIONS FOR RDT IN FULLY VACCINATED POPULATIONS?</p>	<ul style="list-style-type: none"> • No peer reviewed studies or grey literature reports were identified that addressed this issue. • Insight from expert collaborators and public members suggest that there are key economic and social benefits to RDT even in a fully vaccinated context

Conclusion

At this stage of vaccine roll-out, there is no high quality evidence nor international guidance on how to handle or deploy RDT in the context of fully vaccinated populations. Public members suggested that RDT will continue to be useful amongst other public health tools and in particular may be best targeted in particularly vulnerable settings and/ or where time is of the essence (i.e., schools, workplaces, health facilities, travel hubs, remote/ rural communities). Noting so-called breakthrough cases and vaccines being potentially less effective with certain VOCs, as well as individuals either unwilling or ineligible to receive a vaccine (e.g., children <12), content experts stated that it would be prudent to have a full range of testing options available even once herd immunity is reached. As with all things COVID, as the literature is evolving quickly, it will be important to update this review on a regular basis.

Protocol/Topic Registration

Not applicable



Introduction

Vaccination rollout in Canada could fully vaccinate 70% or more of the population by the Fall 2021. While this rollout proceeds, testing remains a key component of Canada's pandemic strategy to mitigate and contain COVID-19. However, it is increasingly important to consider emerging evidence on how testing policies should be modified for those who have been vaccinated and in the context of a population in which herd immunity has been reached. Other recent reviews have examined the effectiveness of various point-of-care and rapid diagnostic tests (RDT).¹ The intention here was not to duplicate these efforts but rather to look specifically at RDT in the context of fully vaccinated populations. In addition to the effectiveness of RDT in this context we were also asked by Health Canada to determine if there was evidence on relevant social and economic considerations.

Research questions:

1. What scientific evidence exists and what international guidance exists on the use and effectiveness of testing for SARS-CoV-2 and its VOCs in a fully vaccinated population (i.e., lab-based PCR, point-of-care PCR, rapid antigen testing, LAMP testing, and any others)?
2. What evidence exists on the social and economic considerations for testing in a fully vaccinated population? What are the recommended goals and testing strategies for individuals who have been fully vaccinated? What policy actions are needed to address social and economic impacts of positive test results?

Methods

Search strategy and screening

An experienced medical information specialist developed and tested the search strategies through an iterative process in consultation with the review team. Another senior information specialist peer reviewed the MEDLINE strategy prior to execution using the PRESS Checklist.²

Using the multifile option and deduplication tool available on the OVID platform, we searched Ovid MEDLINE®ALL, including Epub Ahead of Print, In-Process & Other Non-Indexed Citations, and Embase+Embase Classic. We also searched the Cochrane Library (Database of Systematic Reviews, CENTRAL) on Wiley, the Web of Science Core Collection, the L-OVE Platform, COVID-END, ClinicalTrials.gov (COVID-19), and the WHO Covid-19 database. We performed all searches on June

¹ Kelly S, Wells G. Rapid and point-of-care diagnostic tests for SARS-CoV-2 (COVID-19). SPOR Evidence Alliance, June 2021.

² McGowan J, Sampson M, Salzwedel DM, Cogo E, Foerster V, Lefebvre C. PRESS Peer Review of Electronic Search Strategies: 2015 guideline statement. *J Clin Epidemiol* 2016;75:40-6. Available: [http://www.jclinepi.com/article/S0895-4356\(16\)00058-5/pdf](http://www.jclinepi.com/article/S0895-4356(16)00058-5/pdf).



14, 2021, except for those in ClinicalTrials.gov and the WHO database, which were performed on June 15, 2021. Specific details regarding the strategies appear in Appendix A.

The strategies utilized a combination of controlled vocabulary (e.g., “COVID-19”, “Vaccination”, “COVID-19 Testing”) and keywords (e.g., “nCoV”, “vaccinated”, “screening”). Vocabulary and syntax were adjusted across the databases. No language restrictions were applied but results were limited to the publication years 2020 to the present. Results were downloaded and deduplicated using EndNote version 9.3.3 (Clarivate Analytics) and uploaded to Excel.

Four team members carried out the initial title and abstract screen (single reviewer screening) following a calibration exercise and then one team member undertook the full study data extraction using a data extraction form developed for this study (with quality assessment conducted by two team members using the relevant CASP checklists³).

In addition, grey literature was searched through McMaster Plus, Google and the CADTH COVID-19 Evidence platform. Links to several recent Cochrane reviews were also provided by Dr. Jeremy Grimshaw (personal communication) and a series of documents and links were provided by Health Canada upon commissioning the review (see Appendix B). Finally, Dr. Sabrina Wong provided papers and not yet published work from her team as well as other potentially relevant studies. Finally, key country websites were searched to inform the question on existing international guidance.

Population/ problem:

1. We included either quantitative empirical or modeling results about **effectiveness** of SARS-CoV-2 testing in a fully vaccinated population.

Interpretation:

- any quantitative design is eligible
- study protocols and case reports are excluded
- any outcome measure of effectiveness as defined by the authors is eligible
- exclude anything in which the initial efficacy of the test itself is being studied
- include studies which refer to a fully vaccinated population or a population with herd immunity, if those terms are not explicitly defined. If defined, include only studies which set a threshold level of 70% adult population coverage.

2. We included studies on empirical findings or modeling results, or other evidence, about **social impacts** of SARS-CoV-2 testing in a fully vaccinated population.

Interpretation:

- empirical designs can be either qualitative or quantitative
- include ethical or policy analyses

³ Critical Appraisal Skills Programme (CASP) checklist. www.casp-uk.net

- exclude opinion pieces, commentary or editorials
3. We included studies on empirical findings or modeling results, or other evidence, about **economic impacts** of SARS-CoV-2 testing in a fully vaccinated population.

Interpretation:

- economic impacts can be at the societal level, the health system level, the insurer or the individual
- empirical designs can be either qualitative or quantitative
- exclude opinion pieces, commentary or editorials

Synthesis approach

Studies included upon abstract screening were summarized in a table with a decision for final inclusion stated. Results from full data extraction were discussed by the research team and were summarized in text. Country searching for international guidance was summarized and presented in a table. Results were discussed within our team as well as with two content experts from the University of British Columbia (Drs. Haase and Wong).

Public member input

Five public members were engaged at the early stages of this project, four from BC and one from Alberta. As the study question was already developed by Health Canada, we were unable to have true 'citizen partners'. Instead, we engaged these five individuals immediately following our initial meeting with Health Canada. These individuals were given a series of questions (see Appendix C) to consider on the topic of rapid diagnostic testing to better understand issues of importance to them including relevant outcomes and policies from a citizen perspective. Input was summarized in text.

Results

Study selection and quality

Table 1 outlines the number of studies by source found through our search.

Table 1: PRISMA June 14-15

Source	Original	Deduped
MEDLINE	667	646
Embase	233	224
WoS	564	345
CDSR	5	5
CENTRAL	76	60
COVID_END	0	0

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L-OVE	373	298
Ctgov	211	191
WHO Covid	57	28
TOTAL	2186	1797

Of the 1797 studies identified, just seven were initially screened in (see Table 2). Following full text review, a further four studies were excluded. Of the three full-text articles that were retained for review, all were published in 2021.

Two of the three papers are available as pre-prints; they have not yet been peer-reviewed. Based on two independent reviews of each study using the CASP checklist for diagnostic studies, the overall quality of these papers is moderate. Papers addressed a clear question, with a clearly defined disease marker (SARS-CoV-2). Testing processes were fully described, and the findings should be generally applicable to the broader public. However, studies used a case control design, developing tests using biological samples “already known by other means to have the diagnosis of interest and investigating whether the test of interest correctly identifies them,” a design weakness according to the Joanna Briggs Institute Critical Appraisal Tool for Diagnostic Test Accuracy⁴. It was unclear whether the analyses were blinded to previous assessments, and issues of implementation, scalability, and social/economic impacts were not addressed. See Appendix D for quality assessment scoring.

Also note quality assessment of the three studies was limited to considerations of reporting. While risk of bias tools are available for the assessment of comparative diagnostic test accuracy studies, the studies identified in our review do not qualify under this description as all are reporting the results from development and validation of a single test.⁵ Finally, there are potential conflicts of interest, in that co-authors in two of the papers (Brosi et al, Miyakawa et al) are identified as employees of laboratories which may be involved in developing the tests and potentially could benefit from their adoption into clinical use. The lead author of the third paper (Du et al) appears to be an employee of a laboratory cited in the text as well, though no conflict of interest declaration is included.

Table 2: Studies screened in upon abstract review

Authors	Purpose	Findings & conclusions	Include/ exclude
Brosi et al, 2021	They have developed a “unique rapid immunoassay” test. Developed using banked blood from positively diagnosed patients, and from self-administered pinpricks by a set of	Sensitivity and specificity seem in the same range as in the Ekelund paper. Authors conclude: “this test can serve as an inexpensive and rapid alternative to sophisticated SARS CoV-2 neutralizing	Proposes a use within vaccinated populations; Include

⁴ Available at: <https://jbi.global/critical-appraisal-tools>

⁵ <https://abstracts.cochrane.org/2011-madrid/quadas-2-updated-quality-assessment-tool-diagnostic-accuracy-studies>

	vaccinated (Pfizer or Moderna) patients.	antibody assays. Moreover, the test allows to monitor vaccination success of RBD-based vaccines and can help to improve current and future vaccination strategies.”	
Ekelund et al, May 2021	To test the specificity and sensitivity of four different COVID-19 tests	Tests are less effective than manufacturers’ data, and would mostly not meet national Public Health Agency guidelines. May be inadequate when population sero-prevalence is low (i.e., when few people have been exposed to COVID)	Not specifically addressing fully vaccinated population; Exclude
Du et al, April 2021	Test (sample of 50 patients vaccinated with Moderna).	This is a pre-print, not yet peer reviewed. This is also a finger-stick based test, which they conclude is suitable for large-scale use in a vaccinated population	Proposes a use within vaccinated populations; Include
Miyakawa et al, May 2021	Authors have previously developed a test, which they find can be used for high throughput in low biosafety settings. They are testing to see if it works with variants.	This is a pre-print, not yet peer reviewed. Authors conclude: “our modified hiVNT would be useful for large-scale community wide testing to detect protective immunity that may confer vaccine/immune passport”. In other words they are arguing that it is important to monitor for emergence of new variants, and this test would do the job. Also suggest that the vaccines being used are acceptably effective against variants.	Proposes a use within vaccinated populations; Include
Salazar et al, May 2021	The authors build models, based on community transmission data, to predict cases and deaths in LTC homes in the absence of vaccination, and then compared with real data from the vaccinated population.	This is a pre-print, not yet peer reviewed. Results suggest that vaccination prevented ¾ of expected infections and deaths.	Does not speak to the role of testing; Exclude
Pritchard et al, 2021	Aim was to assess the effectiveness of vaccines, using data from a large community - based survey study. Tests were conducted on a fixed schedule, regardless of	Both Pfizer and AstraZenaca reduced odds of participants testing positive with a new COVID infection. Equally effective against the main circulating UK variant.	Does not speak to the role of testing; Exclude

	vaccination status, confirmed illness or reported symptoms; thus it should measure community prevalence.	Vaccination confers same degree of antibody protection as previous infection (a consideration for vaccine passport development). A suggestion that duration of vaccine benefits remains unknown; however, does not address if that has implications for testing.	
Seow et al, Dec 2020	The goal is to test how long antibody responses to COVID are maintained. Tests are done with people who have had infections (as data collection precedes vaccination rollout) but possibly might be generalized. Study population is blood from 65 patients with confirmed COVID and 31 sero-positive health care workers. Three-month follow up.	Findings suggest antibody response peaks at 3-4 weeks post infection, and then declines. Decline seems to plateau for many but continues to negligible levels for those with mild cases. Call for further longitudinal study.	May be some implications for testing, in terms of length of follow-up, but not explicitly considered by authors; Exclude

Summary of findings

Following the literature search for published evidence on testing effectiveness in a fully vaccinated population, three full-text articles were retained for review. They all address development of tests which can be administered “with high throughput in a low biosafety setting” (Miyakawa et al); in other words, tests which could be employed in regular clinics or at home. One test (Brosi et al) is antigen-based, which is acceptable for diagnostic purposes; the other two of the tests are serology-based, using finger-prick blood samples taken at home and delivered to a laboratory for analysis (Miyakawa et al, Du et al) and which can be used to assess exposure and immunity but not for diagnostic purposes (See: <https://www.fda.gov/consumers/consumer-updates/coronavirus-disease-2019-testing-basics>; <https://www.mayoclinic.org/diseases-conditions/coronavirus/expert-answers/covid-antibody-tests/faq-20484429>). Two of the tests use qualitative cut off values (Brosi et al, Miyakawa et al), while Du et al work towards a quantitative cut off.

The rationale provided by these papers for continued testing in a vaccinated population is that testing is needed to know the degree to which the population has developed immunity. Brosi et al suggest testing should be “to monitor vaccination success ... and can help to improve current and future vaccination strategies.” Miyakawa et al argue that their test “would be useful for large-scale community wide testing to detect protective immunity.” Du et al state that “as more vaccines are being made available for large scale vaccination, it is highly desirable to have a simple and convenient test for detecting anti-SARS-CoV-2 IgG antibody”. There is little further elaboration in any of the papers upon how, in Brosi’s terms, the information would influence or inform vaccination strategies, though Miyakawa et al suggest that it

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could be used in creating “vaccine passports”. None of the papers speaks directly to the social or economic impacts of this or other policy choices.

Implicitly, papers suggest that the duration of immunity is worth knowing; evidence is currently unclear as to how long immunity (from previous illness, or vaccine-produced) will last and if/when re-vaccination or boosters might be needed. There is no indication of the scale on which such surveillance should be conducted in order to achieve this.

Grey literature

A summary of the grey literature searches is as follows:

- McMaster Plus COVID-19 evidence alerts <https://plus.mcmaster.ca/COVID-19/>
 - ‘rapid diagnostic testing’ produced 5 hits; 0 included.
 - ‘point-of-care’ produced 9 hits; 0 included.
- CADTH COVID-19 evidence portal <https://covid.cadth.ca/>
 - ‘rapid diagnostic testing’ produced 0 hits.
 - ‘point-of-care’ produced 2 hits; 0 included.
- Google Scholar:
 - ‘covid’ AND ‘rapid diagnostic test’ AND ‘fully vaccinated’ with a date limit of 2021 = 2 hits; 0 included.
 - ‘covid’ AND ‘rapid diagnostic test’ AND ‘fully vaccinated’ with a date limit of 2021 = 34 hits; 0 included.

International guidance

Websites from 18 countries were reviewed for any guidance related to RDT and/ or point-of-care testing in vaccinated populations (see Table 3).

Table 3: Country specific website searches

Country	Title	Date (Most Recent Update or Publication)	Summary
USA	Interim Guidance for Antigen Testing for SARS-CoV-2	June 14, 2021	People are considered fully vaccinated if they are ≥2 weeks following receipt of the second dose in a 2-dose series (mRNA vaccines), or ≥2 weeks following receipt of a single-dose vaccine (Johnson & Johnson/Janssen). If a symptomatic, fully vaccinated individual receives a positive antigen test result, the healthcare provider

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			should inform public health authorities. Ideally, a separate specimen would be collected and sent to a laboratory for viral sequencing for public health purposes.
USA	Interim Public Health Recommendations for Fully Vaccinated People	May 28, 2021	Fully vaccinated people should still get tested if experiencing COVID-19 symptoms. Fully vaccinated people should not visit private or public settings if they have tested positive for COVID-19 in the prior 10 days or are experiencing COVID-19 symptoms. Most fully vaccinated people with no COVID-like symptoms do not need to quarantine, be restricted from work, or be tested following an exposure to someone with suspected or confirmed COVID-19, as their risk of infection is low. Exceptions where testing (but not quarantine) is still recommended following an exposure to someone with suspected or confirmed COVID-19 include: Fully vaccinated residents and employees of correctional and detention facilities and homeless shelters. It is recommended that fully vaccinated people with no COVID-19-like symptoms and no known exposure should be exempted from routine screening testing programs, if feasible.
USA	When You've Been Fully Vaccinated	May 16, 2021	If you travel in the United States, you do not need to get tested before or after travel or self-quarantine after travel. You do NOT need to get tested before leaving the United States unless your destination requires it. You should still get tested 3-5 days after international travel. If you've been around someone who has COVID-19, you do not need to stay away from others or get tested unless you have symptoms. However, if you live or work in a correctional or detention facility or a homeless shelter and are around someone who has COVID-19, you should still get tested, even if you don't have symptoms.
Israel	Testing for COVID-19	March 25, 2021	Serological coronavirus tests are a blood test for the detection of coronavirus antibodies in the blood stream (as opposed to the swab tests that detect the virus itself). This type of testing is not suitable for symptomatic

			COVID-19 patients, or recovered COVID-19 patients, or to people who will have received one dose of the COVID-19 vaccine.
Israel	Rapid Coronavirus Testing	March 24, 2021	The rapid tests provider must test any individual who does not have a Green Pass and wants to enter a venue that complies with Green Pass requirements. A Green Pass grants permission to enter places and buildings if you have been fully vaccinated or have recovered from coronavirus (COVID-19). No specific mention of rapid testing guidance for fully vaccinated people.
UK	(COVID-19) Coronavirus restrictions: what you can and cannot do	June 14, 2021	No specific guidance for fully vaccinated population. No mention of testing protocol (or guidance) for fully vaccinated individuals found on the UK Government and NHS websites.
UK	Regular rapid lateral flow coronavirus (COVID-19) tests	June 11, 2021	No specific guidance for fully vaccinated population. No mention of testing protocol (or guidance) for fully vaccinated individuals found on the UK Government and NHS websites.
UK	Get tested for coronavirus (COVID-19)	June 10, 2021	No specific guidance for fully vaccinated population. No mention of testing protocol (or guidance) for fully vaccinated individuals found on the UK Government and NHS websites.
Germany	More and targeted COVID-19 testing	June 3, 2021	No specific guidance for fully vaccinated population. No mention of testing protocol (or guidance) for fully vaccinated individuals found on the German Government and German Ministry of Health websites.
Germany	For vaccination against COVID-19 (Corona Virus Disease 2019)	May 12, 2021	No specific guidance for fully vaccinated population. No mention of testing protocol (or guidance) for fully vaccinated individuals found on the German Government and German Ministry of Health websites.
Germany	Information on entry restrictions, testing and	May 31, 2021	Not directly relevant to testing for fully vaccinated people, but may offer insights as there is no other information. Germany no longer requires testing for those

	quarantine regulations in Germany		who have been vaccinated and/or have recovered from COVID-19.
France	RESTRICTIONS AND REQUIREMENTS IN METROPOLITAN FRANCE	June 9, 2021	No specific guidance for fully vaccinated population. Guidelines for vaccinated population not mentioned.
France	Les tests RT-PCR, antigéniques et salivaires	February 4, 2021	Testing is accessible to all who fill out the following form: https://solidarites-sante.gouv.fr/IMG/pdf/formulaire_pre-enregistrement_realisation_examen_depistage_covid-19.pdf .
Netherlands	Reopening society step by step	June 7, 2021	Government plans of introducing pre-admission tests for activities like concerts, museum visits, sporting competitions, etc. with a number of pilots already taking place. However, these measures are not explicitly stated as being for the fully vaccinated population.
Netherlands	Testing	May 5, 2021	Once people have been vaccinated, the vaccine will protect them against the virus. However, a person who has been vaccinated must still keep following the measures, just like everyone else, until enough people in the Netherlands have been vaccinated. No specific references to testing for vaccinated individuals.
Belgium	Covid-19 testing	June 16, 2021	No specific guidance for fully vaccinated population. No mention of testing protocol (or guidance) for fully vaccinated individuals found on the Belgian government website.
Belgium	Vaccination	June 16, 2021	No specific guidance for fully vaccinated population. No mention of testing protocol (or guidance) for fully vaccinated individuals found on the Belgian government website.
Switzerland	Coronavirus : Tests	June 4, 2021	No specific guidance for fully vaccinated population. However, both symptomatic and asymptomatic testing is

			recommended in Switzerland. Regular testing is one of the main pillars of the COVID-19 response.
Sweden	COVID-19 testing	May 24, 2021	If you have been vaccinated against COVID-19 in the past few days and experience symptoms that are common side effects after a vaccination you do not need to get tested if the symptoms disappear within 24 hours.
Italy	FAQ - Covid-19, questions and answers	April 29, 2021	No mention of rapid testing for fully vaccinated population.
Spain	Estrategia de vacunación frente a COVID19 en España [translation: Vaccination strategy against COVID-19 in Spain]	May 11, 2021	"Serological or virological tests are not recommended before or after vaccination." [NOTE: translated from Spanish – may not be an accurate translation]
Austria	Planned re-opening steps as of 19 May 2021	May 19, 2021	As soon as the relevant legislative basis is put into effect, vaccinated persons will also be exempt from mandatory testing. This exemption will apply for one year as of day 22 following initial vaccination.
Austria	Austrian Testing Strategy for SARS-CoV-2	March 11, 2021	The testing strategy as described here also does not consider measures such as vaccinations, which can influence levels of infection and thus possibly also the testing strategy. [NOTE: outdated in favour of the source listed above.]

*Other countries were also searched including South Korea, Japan, Chile, Uruguay, UAE, Bahrain. No relevant information was identified.

From this review of various countries across Europe and elsewhere, it is clear that very few (if any) countries are considering the question of RDT protocols in the context of a fully vaccinated population. Some specific guidance is offered to individuals, e.g., in the US and Sweden, with respect to whether to get tested after having been vaccinated, but there is no guidance that we could identify that speaks specifically to the question of RDT and vaccination.

Public member input

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The five public members ranged in age from 49 to 78 and all lived in either BC or Alberta. There were three males and two females. Three respondents are employed full time and two are retired. None of the respondents have had COVID-19 and none had firsthand experience with rapid diagnostic testing.

Overall these individuals believed that RDT is one tool among many in terms of the public health arsenal for COVID-19. There was a belief that RDT could provide for more timely diagnosis which would be particularly relevant in some settings (e.g., workplace, schools and travel hubs). One individual also stated potential benefit at point of entry to long term care homes or hospitals.

The benefits could range from 'alleviation of stress' to 'improved productivity' noting the faster turnaround time on results. Three of five individuals felt that RDT should be available in a fully vaccinated context and in this referred to breakthrough cases and VOCs. There was a mixed response as to whether government resources should be allocated to RDTs. Two individuals noted the potential trade-off between increased timeliness vs. decreased accuracy.

Discussion

Reaching full population levels of vaccination against SARS-Cov-2 provides the opportunity to rethink our testing paradigm. It raises the questions of, going forward, who should be tested, when, where and for what purposes? At this point, there is little published or in worldwide practice for an evidence-based roadmap to that end. This is perhaps unsurprising, as the real-world events and the literature responding to them are evolving quickly.

We find in the most recent literature the development of new tests, using a range of technologies, purportedly offering simple and possibly inexpensive means to high-volume, relatively rapid turnaround in monitoring population levels of immunity. This may be useful – to track the emergence of new variants, or to identify if waning levels of immune response suggest a need for re-vaccinations. There is not enough evidence at present for certainty on these points. For instance, if the delta VOC takes hold as it has in the UK, there will need to be testing options including RDT on hand should hospitalizations and other adverse events begin to trend upward again. Importantly, from the perspective of this review, there is not yet evidence about the appropriate scale or focus of surveillance testing which would best achieve these ends.

There are suggestions that in some settings regular testing will be expected, such as in universities. For instance, the University of Alicante (in Spain) includes random sample testing as part of its reopening plans (Tuells et al, 2021) and universities in Canada may be choosing to follow a similar route. That is because responsibility and risk fall to these individual organizations. There is a health and economic case which can be made here, in terms of protecting the younger population (<12) who cannot yet be vaccinated and may experience and spread Covid-19 asymptotically. Industries involving close personal working, or fly-in camps in isolated First Nations territories face similar circumstances. Long term care settings may continue to pose concerns as well, as it is yet unclear if the elderly receive the same intensity and duration of immune response to vaccination as younger adults appear to. We found no literature addressing legal, social or economic implications of these factors when there is otherwise Rapid Diagnostic Testing for COVID-19 in a fully vaccinated population



full vaccination achieved at the population level. Public members consulted for this review did perceive that testing may continue to be valuable and best targeted in particularly vulnerable settings and/ or where time is of the essence (e.g., schools, workplaces, health facilities, travel hubs). In these various settings, as was emphasized by the content experts consulted, equity issues clearly need to be taken into consideration.

Literature in this area should rapidly expand. At this point in time, much of what we identified was in pre-print form, not yet having undergone peer review. So, the quality of the studies reviewed here should be considered with care. The literature search was expansive and conducted by a trained library professional according to best practices, so we are confident that little of importance would have been missed. This was corroborated by the two content experts consulted following the review. The worldwide scan of health agencies indicates that, in practice, no one has yet created clear guidelines (at least that are publicly posted) as to how SARS-Cov-2 testing ought to be managed once full vaccination of the population has been achieved.

Conclusion

At this stage of vaccine roll-out, there is no clear evidence in published literature nor international guidance from key national health agencies on how to handle or deploy rapid tests in the context of fully vaccinated populations. Noting so-called breakthrough cases and vaccines being potentially less effective with certain VOCs, as well as individuals either unwilling or ineligible to receive a vaccine (e.g., children <12), it would seem prudent to have a full range of testing options available even once herd immunity is reached. As the literature is evolving quickly, further focused attention to this subject is recommended over the coming months.





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Tuells, J. et al. 2021 Feb 16. Seroprevalence Study and Cross-Sectional Survey on COVID-19 for a Plan to Reopen the University of Alicante (Spain). *Int J Environ Res Public Health*;18(4):1908. doi: 10.3390/ijerph18041908

Appendix A: Search strategies

2021 Jun 14-15

Ovid Multifile

Database: Embase Classic+Embase <1947 to 2021 June 11> , Ovid MEDLINE(R) ALL <1946 to June 11, 2021>

Search Strategy:

-
- 1 COVID-19/ (85232)
 - 2 SARS-CoV-2/ (81004)
 - 3 Coronavirus/ (13336)
 - 4 Betacoronavirus/ (40889)
 - 5 Coronavirus Infections/ (56671)
 - 6 (COVID-19 or COVID19).tw,kf. (248384)
 - 7 ((coronavirus* or corona virus*) and (hubei or wuhan or beijing or shanghai)).tw,kf. (9586)
 - 8 (wuhan adj5 virus*).tw,kf. (495)
 - 9 (2019-nCoV or 19nCoV or 2019nCoV).tw,kf. (3010)
 - 10 (nCoV or n-CoV or "CoV 2" or CoV2).tw,kf. (89874)
 - 11 (SARS-CoV-2 or SARS-CoV2 or SARSCoV-2 or SARSCoV2 or SARS2 or SARS-2 or severe acute respiratory syndrome coronavirus 2).tw,kf. (91529)
 - 12 (2019-novel CoV or Sars-coronavirus2 or Sars-coronavirus-2 or SARS-like coronavirus* or ((novel or new or nouveau) adj2 (CoV or nCoV or covid or coronavirus* or corona virus or Pandemi*2)) or (coronavirus* and pneumonia)).tw,kf. (35031)
 - 13 (novel coronavirus* or novel corona virus* or novel CoV).tw,kf. (17810)
 - 14 ((coronavirus* or corona virus*) adj2 "2019").tw,kf. (57328)
 - 15 ((coronavirus* or corona virus*) adj2 "19").tw,kf. (9106)
 - 16 (coronavirus 2 or corona virus 2).tw,kf. (29558)
 - 17 (OC43 or NL63 or 229E or HKU1 or HCoV* or Sars-coronavirus*).tw,kf. (7506)
 - 18 COVID-19.rx,px,ox. or severe acute respiratory syndrome coronavirus 2.os. (6370)
 - 19 (coronavirus* or corona virus*).ti. (43389)
 - 20 ("B.1.1.7" or "B.1.351" or "B.1.617" or "B.1.427" or "B.1.429").tw,kf,rx,px,ox. (617)
 - 21 ("P.1" and (Brazil* or variant?)).tw,kf,rx,px,ox. (3398)
 - 22 ((alpha or beta or delta or gamma) adj3 variant?).tw,kf. (11649)
 - 23 or/1-22 [COVID-19] (323816)
 - 24 vaccinated.tw,kf. (99353)
 - 25 inoculated.tw,kf. (163961)
 - 26 immuni#ed.tw,kf. (126633)
 - 27 post-vaccinat*.tw,kf. (10477)
 - 28 post-inoculat*.tw,kf. (11749)
 - 29 post-immuni*.tw,kf. (3749)
 - 30 ((after or already or full or fully or post or received) adj3 (immunis* or immuniz* or immunity or inoculat* or vaccin*).tw,kf. (192305)
 - 31 (status* adj3 (immunis* or immuniz* or immunity or inoculat* or vaccin*).tw,kf. (17201)
 - 32 or/24-31 [VACCINATED] (494180)
 - 33 23 and 32 [COVID-19 - VACCINATED POPULATIONS] (5475)
 - 34 exp Vaccination/ (289605)

Rapid Diagnostic Testing for COVID-19 in a fully vaccinated population

35 23 and 34 (6340)
 36 exp COVID-19 Vaccines/ (2996)
 37 ((COVID-19 or COVID19) adj5 (immun* or inoculat* or vaccin*)).tw,kf. (14318)
 38 ((coronavirus* or corona virus*) adj5 (immun* or inoculat* or vaccin*)).tw,kf. (4004)
 39 ((2019-nCoV or nCoV or n-CoV or SARS-CoV-2 or SARS-CoV2 or SARSCoV-2 or SARSCoV2 or SARS2) adj5 (immun* or inoculat* or vaccin*)).tw,kf. (8744)
 40 (((BNT162 or BNT162-01 or BNT162a1 or BNT162b1 or BNT162b2 or BNT162c2) and vaccin*) or N38TVC63NU).tw,kf. (558)
 41 (((AZD1222 or ChAdOx1) and vaccin*) or Covishield\$2 or B5S3K2V0G8).tw,kf. (380)
 42 ((mRNA-1273 and vaccin*) or EPK39PL4R4).tw,kf. (261)
 43 ((mRNA adj3 vaccin*) and (COVID-19 or COVID19 or coronavirus* or corona virus* or 2019-nCoV or nCoV or n-CoV or SARS-CoV-2 or SARS-CoV2 or SARSCoV-2 or SARSCoV2 or SARS2)).tw,kf. (974)
 44 ((messenger RNA adj3 vaccin*) and (COVID-19 or COVID19 or coronavirus* or corona virus* or 2019-nCoV or nCoV or n-CoV or SARS-CoV-2 or SARS-CoV2 or SARSCoV-2 or SARSCoV2 or SARS2)).tw,kf. (84)
 45 (LV-SMENP-DC and vaccin*).tw,kf. (5)
 46 ((Ad5-nCoV and vaccin*) or hAdOx1 nCoV-19).tw,kf. (25)
 47 ("Ad26.COVS1" or Ad26COVS1 or JNJ 78436735 or JNJ-78436735 or JT2NS6183B) and vaccin*).tw,kf. (74)
 48 Viral Vaccines/ and (Coronavirus/ or Betacoronavirus/ or Coronavirus Infections/) (1909)
 49 or/35-48 [VACCINATION, COVID-19 VACCINES] (27484)
 50 exp United Kingdom/ (838323)
 51 (national health service* or nhs*).ti,ab,in. (549264)
 52 (english not ((published or publication* or translat* or written or language* or speak* or literature or citation*) adj5 english)).ti,ab. (91071)
 53 (gb or "g.b." or britain* or (british* not "british columbia") or uk or "u.k." or united kingdom* or (england* not "new england") or northern ireland* or northern irish* or scotland* or scottish* or ((wales or "south wales") not "new south wales") or welsh*).ti,ab,jw,in. (5616268)
 54 (bath or "bath's" or ((birmingham not alabama*) or ("birmingham's" not alabama*) or bradford or "bradford's" or brighton or "brighton's" or bristol or "bristol's" or carlisle* or "carlisle's" or (cambridge not (massachusetts* or boston* or harvard*)) or ("cambridge's" not (massachusetts* or boston* or harvard*)) or (canterbury not zealand*) or ("canterbury's" not zealand*) or chelmsford or "chelmsford's" or chester or "chester's" or chichester or "chichester's" or coventry or "coventry's" or derby or "derby's" or (durham not (carolina* or nc)) or ("durham's" not (carolina* or nc)) or ely or "ely's" or exeter or "exeter's" or gloucester or "gloucester's" or hereford or "hereford's" or hull or "hull's" or lancaster or "lancaster's" or leeds* or leicester or "leicester's" or (lincoln not nebraska*) or ("lincoln's" not nebraska*) or (liverpool not (new south wales* or nsw)) or ("liverpool's" not (new south wales* or nsw)) or ((london not (ontario* or ont or toronto*)) or ("london's" not (ontario* or ont or toronto*)) or manchester or "manchester's" or (newcastle not (new south wales* or nsw)) or ("newcastle's" not (new south wales* or nsw)) or norwich or "norwich's" or nottingham or "nottingham's" or oxford or "oxford's" or peterborough or "peterborough's" or plymouth or "plymouth's" or portsmouth or "portsmouth's" or preston or "preston's" or ripon or "ripon's" or salford or "salford's" or salisbury or "salisbury's" or sheffield or "sheffield's" or southampton or "southampton's" or st albans or stoke or "stoke's" or sunderland or "sunderland's" or truro or "truro's" or wakefield or "wakefield's" or wells or westminster or "westminster's" or winchester or "winchester's" or wolverhampton or "wolverhampton's" or (worchester not (massachusetts* or boston* or harvard*)) or ("worchester's" not (massachusetts* or boston* or harvard*))



harvard*) or (york not ("new york*" or ny or ontario* or ont or toronto*)) or ("york's" not ("new york*" or ny or ontario* or ont or toronto*))))).ti,ab,in. (4200882)

55 (bangor or "bangor's" or cardiff or "cardiff's" or newport or "newport's" or st asaph or "st asaph's" or st davids or swansea or "swansea's").ti,ab,in. (168343)

56 (aberdeen or "aberdeen's" or dundee or "dundee's" or edinburgh or "edinburgh's" or glasgow or "glasgow's" or inverness or (perth not australia*) or ("perth's" not australia*) or stirling or "stirling's").ti,ab,in. (595868)

57 (armagh or "armagh's" or belfast or "belfast's" or lisburn or "lisburn's" or londonderry or "londonderry's" or derry or "derry's" or newry or "newry's").ti,ab,in. (79297)

58 or/50-57 (7009182)

59 (exp africa/ or exp americas/ or exp antarctic regions/ or exp arctic regions/ or exp asia/ or exp australia/ or exp oceania/) not (exp United Kingdom/ or europe/) (6414223)

60 58 not 59 [NICE UK GEOGRAPHIC FILTER] (6650547)

61 49 and 60 [COVID-19 - UK] (3738)

62 Israel/ (65331)

63 israel*.ti,ab,jw,in. (671003)

64 (Jerusalem* or "Northern District" or "Nof Hagalil" or Safed or "Safed's" or Tzfat* or Kinneret* or "yizre'el" or Jezreel* or Akka or "Akka's" or Akko or "Akko's" or "Acre Subdistrict" or Golan or "Golan's" or Haifa or Haifa's or Hadera or Hadera's or Central District or Ramla or Ramla's or HaSharon* or Netanya* or Petah Tikva* or Rehovot* or Tel Aviv* or Gush Dan* or West Bank or West Bank's or Southern District or Beersheba* or Be'er Sheva or Be'er Sheva's or Ashkelon* or Ashdod* or Omer or Omer's or Meitar or Meitar's or Lehavim* or Sderot* or Netivot* or Ofakim* or Ashkelon* or Ariel or Ariel's or Modi'in Illit or "the Territories").ti,ab,in. (488433)

65 ("Judea and Samaria" or "Judea and Samaria's").ti,ab,in. (327)

66 or/62-65 [ISRAEL GEOGRAPHIC FILTER] (770431)

67 49 and 66 [COVID-19 - ISRAEL] (808)

68 61 or 67 [COVID-19 - UK & ISRAEL] (4417)

69 33 or 68 [COVID-19 - VACCINATED POPS, UK, ISRAEL] (9234)

70 exp COVID-19 Testing/ (5818)

71 COVID-19/di [diagnosis] (5480)

72 Coronavirus Infections/di [diagnosis] (8815)

73 ((COVID or COVID-19 or COVID19) adj3 (assay? or immunoassay? or immuno-assay? or detect* or diagnos* or screen* or test*)).tw,kf. (19205)

74 ((coronavirus* or corona virus*) adj3 (assay? or immunoassay? or immuno-assay? or detect* or diagnos* or screen* or test*)).tw,kf. (3994)

75 ((2019-nCoV or 19nCoV or 2019nCoV or nCoV or n-CoV or "CoV 2" or CoV2) adj3 (assay? or immunoassay? or immuno-assay? or detect* or diagnos* or screen* or test*)).tw,kf. (12368)

76 ((SARS-CoV-2 or SARS-CoV2 or SARSCoV-2 or SARSCoV2 or SARS2 or SARS-2 or severe acute respiratory syndrome coronavirus 2) adj3 (assay? or immunoassay? or immuno-assay? or detect* or diagnos* or screen* or test*)).tw,kf. (14863)

77 (("B.1.1.7" or "B.1.351" or "B.1.617" or "B.1.427" or "B.1.429") adj3 (assay? or immunoassay? or immuno-assay? or detect* or diagnos* or screen* or test*)).tw,kf. (49)

78 ("P.1" adj3 (assay? or immunoassay? or immuno-assay? or detect* or diagnos* or screen* or test*)).tw,kf. (1468)

79 ((alpha or beta or delta or gamma) adj3 variant? adj3 (assay? or immunoassay? or immuno-assay? or detect* or diagnos* or screen* or test*)).tw,kf. (308)

80 Mass Screening/ (170181)

81 screening.tw,kf. (1376788)



- 82 ((mass or population*) adj3 (screen* or test*).tw,kf. (92945)
- 83 (screen* or detect* or identif* or recogni*).ti,kf. (2196778)
- 84 ((early or earlier or earliest or ongoing or regular*) adj5 (screen* or detect* or identif* or recogni*).tw,kf. (520885)
- 85 (case finding? or casefinding?).tw,kf. (13673)
- 86 Point-of-Care Testing/ (18210)
- 87 ((point-of-care or bedside? or bed side? or POC or rapid*) adj3 (assay? or immunoassay? or immuno-assay? or detect* or diagnos* or screen* or test*).tw,kf. (224074)
- 88 (field adj3 (assay? or immunoassay? or immuno-assay? or detect* or diagnos* or screen* or test*).tw,kf. (74207)
- 89 POCT.tw,kf. (4852)
- 90 ((antibody or antibodies or anti-bod* or antigen* or serologic*) adj3 (assay? or immunoassay? or immuno-assay? or test*).tw,kf. (213419)
- 91 (serodiagnos* or sero-diagnos* or serologic* diagnos*).tw,kf. (26319)
- 92 or/70-91 [TESTING] (3882509)
- 93 69 and 92 [COVID-19 - VACCINATED POPS, UK, ISRAEL - TESTING] (1662)
- 94 exp Animals/ not Humans/ (16916426)
- 95 93 not 94 [ANIMAL-ONLY REMOVED] (1332)
- 96 limit 95 to yr="2020-current" (1185)
- 97 96 use medall [MEDLINE RECORDS] (683)
- 98 coronavirus disease 2019/ (204563)
- 99 severe acute respiratory syndrome coronavirus 2/ (98191)
- 100 Coronavirinae/ (4902)
- 101 Betacoronavirus/ (40889)
- 102 coronavirus infection/ (57545)
- 103 (COVID-19 or COVID19).tw,kw. (252592)
- 104 ((coronavirus* or corona virus*) and (hubei or wuhan or beijing or shanghai)).tw,kw. (9726)
- 105 (wuhan adj5 virus*).tw,kw. (518)
- 106 (2019-nCoV or 19nCoV or 2019nCoV).tw,kw. (3338)
- 107 (nCoV or n-CoV or "CoV 2" or CoV2).tw,kw. (89430)
- 108 (SARS-CoV-2 or SARS-CoV2 or SARSCoV-2 or SARSCoV2 or SARS2 or SARS-2 or severe acute respiratory syndrome coronavirus 2).tw,kw. (97485)
- 109 (2019-novel CoV or Sars-coronavirus2 or Sars-coronavirus-2 or SARS-like coronavirus* or ((novel or new or nouveau) adj2 (CoV or nCoV or covid or coronavirus* or corona virus or Pandemi*2)) or (coronavirus* and pneumonia)).tw,kw. (35463)
- 110 (novel coronavirus* or novel corona virus* or novel CoV).tw,kw. (18149)
- 111 ((coronavirus* or corona virus*) adj2 "2019").tw,kw. (57120)
- 112 ((coronavirus* or corona virus*) adj2 "19").tw,kw. (8843)
- 113 (coronavirus 2 or corona virus 2).tw,kw. (29364)
- 114 (OC43 or NL63 or 229E or HKU1 or HCoV* or Sars-coronavirus*).tw,kw. (7685)
- 115 (coronavirus* or corona virus*).ti. (43389)
- 116 ("B.1.1.7" or "B.1.351" or "B.1.617" or "B.1.427" or "B.1.429").tw,kw. (620)
- 117 ("P.1" and (Brazil* or variant?)).tw,kw. (3382)
- 118 ((alpha or beta or delta or gamma) adj3 variant?).tw,kw. (11687)
- 119 or/98-118 [COVID-19] (333008)
- 120 vaccinated.tw,kw. (99345)
- 121 inoculated.tw,kw. (163957)
- 122 immuni#ed.tw,kw. (126637)



- 123 post-vaccinat*.tw,kw. (10511)
- 124 post-inoculat*.tw,kw. (11745)
- 125 post-immuni*.tw,kw. (3751)
- 126 ((after or already or full or fully or post or received) adj3 (immunis* or immuniz* or immunity or inoculat* or vaccin*)).tw,kw. (192224)
- 127 (status* adj3 (immunis* or immuniz* or immunity or inoculat* or vaccin*)).tw,kw. (17214)
- 128 or/120-127 [VACCINATED] (494109)
- 129 119 and 128 [COVID-19 - VACCINATED POPULATIONS] (5430)
- 130 vaccination/ (256628)
- 131 119 and 130 (5801)
- 132 SARS-CoV-2 vaccine/ (6137)
- 133 ((COVID-19 or COVID19) adj5 (immun* or inoculat* or vaccin*)).tw,kw. (16655)
- 134 ((coronavirus* or corona virus*) adj5 (immun* or inoculat* or vaccin*)).tw,kw. (4650)
- 135 ((2019-nCoV or nCoV or n-CoV or SARS-CoV-2 or SARS-CoV2 or SARSCoV-2 or SARSCoV2 or SARS2) adj5 (immun* or inoculat* or vaccin*)).tw,kw. (10317)
- 136 (((BNT162 or BNT162-01 or BNT162a1 or BNT162b1 or BNT162b2 or BNT162c2) and vaccin*) or N38TVC63NU).tw,kw. (567)
- 137 (((AZD1222 or ChAdOx1) and vaccin*) or Covishield\$2 or B5S3K2V0G8).tw,kw. (384)
- 138 ((mRNA-1273 and vaccin*) or EPK39PL4R4).tw,kw. (266)
- 139 ((mRNA adj3 vaccin*) and (COVID-19 or COVID19 or coronavirus* or corona virus* or 2019-nCoV or nCoV or n-CoV or SARS-CoV-2 or SARS-CoV2 or SARSCoV-2 or SARSCoV2 or SARS2)).tw,kw. (981)
- 140 ((messenger RNA adj3 vaccin*) and (COVID-19 or COVID19 or coronavirus* or corona virus* or 2019-nCoV or nCoV or n-CoV or SARS-CoV-2 or SARS-CoV2 or SARSCoV-2 or SARSCoV2 or SARS2)).tw,kw. (87)
- 141 (LV-SMENP-DC and vaccin*).tw,kw. (5)
- 142 ((Ad5-nCoV and vaccin*) or hAdOx1 nCoV-19).tw,kw. (25)
- 143 (("Ad26.COVS1" or Ad26COVS1 or JNJ 78436735 or JNJ-78436735 or JT2NS6183B) and vaccin*).tw,kw. (74)
- 144 virus vaccine/ and (Coronavirinae/ or Betacoronavirus/ or coronavirus infection/) (335)
- 145 or/131-144 [VACCINATION, COVID-19 VACCINES] (29496)
- 146 exp United Kingdom/ (838323)
- 147 (national health service* or nhs*).ti,ab,in,ad. (609172)
- 148 (english not ((published or publication* or translat* or written or language* or speak* or literature or citation*) adj5 english)).ti,ab. (91071)
- 149 (gb or "g.b." or britain* or (british* not "british columbia") or uk or "u.k." or united kingdom* or (england* not "new england") or northern ireland* or northern irish* or scotland* or scottish* or ((wales or "south wales") not "new south wales") or welsh*).ti,ab,jx,in,ad. (5227348)
- 150 (bath or "bath's" or ((birmingham not alabama*) or ("birmingham's" not alabama*) or bradford or "bradford's" or brighton or "brighton's" or bristol or "bristol's" or carlisle* or "carlisle's" or (cambridge not (massachusetts* or boston* or harvard*)) or ("cambridge's" not (massachusetts* or boston* or harvard*)) or (canterbury not zealand*) or ("canterbury's" not zealand*) or chelmsford or "chelmsford's" or chester or "chester's" or chichester or "chichester's" or coventry or "coventry's" or derby or "derby's" or (durham not (carolina* or nc)) or ("durham's" not (carolina* or nc)) or ely or "ely's" or exeter or "exeter's" or gloucester or "gloucester's" or hereford or "hereford's" or hull or "hull's" or lancaster or "lancaster's" or leeds* or leicester or "leicester's" or (lincoln not nebraska*) or ("lincoln's" not nebraska*) or (liverpool not (new south wales* or nsw)) or ("liverpool's" not (new south wales* or nsw)) or ((london not (ontario* or ont or toronto*)) or ("london's" not (ontario* or ont or toronto*)) or manchester or

"manchester's" or (newcastle not (new south wales* or nsw)) or ("newcastle's" not (new south wales* or nsw)) or norwich or "norwich's" or nottingham or "nottingham's" or oxford or "oxford's" or peterborough or "peterborough's" or plymouth or "plymouth's" or portsmouth or "portsmouth's" or preston or "preston's" or ripon or "ripon's" or salford or "salford's" or salisbury or "salisbury's" or sheffield or "sheffield's" or southampton or "southampton's" or st albans or stoke or "stoke's" or sunderland or "sunderland's" or truro or "truro's" or wakefield or "wakefield's" or wells or westminster or "westminster's" or winchester or "winchester's" or wolverhampton or "wolverhampton's" or (worcester not (massachusetts* or boston* or harvard*)) or ("worcester's" not (massachusetts* or boston* or harvard*)) or (york not ("new york*" or ny or ontario* or ont or toronto*)) or ("york's" not ("new york*" or ny or ontario* or ont or toronto*))))).ti,ab,in,ad. (4223136)

151 (bangor or "bangor's" or cardiff or "cardiff's" or newport or "newport's" or st asaph or "st asaph's" or st davids or swansea or "swansea's").ti,ab,in,ad. (169063)

152 (aberdeen or "aberdeen's" or dundee or "dundee's" or edinburgh or "edinburgh's" or glasgow or "glasgow's" or inverness or (perth not australia*) or ("perth's" not australia*) or stirling or "stirling's").ti,ab,in,ad. (598426)

153 (armagh or "armagh's" or belfast or "belfast's" or lisburn or "lisburn's" or londonderry or "londonderry's" or derry or "derry's" or newry or "newry's").ti,ab,in,ad. (79555)

154 or/146-153 (6691531)

155 (exp "arctic and antarctic"/ or exp oceanic regions/ or exp western hemisphere/ or exp africa/ or exp asia/) not (exp united kingdom/ or europe/) (4431451)

156 154 not 155 [NICE UK GEOGRAPHIC FILTER] (6403924)

157 145 and 156 [COVID-19 - UK] (4024)

158 Israel/ (65331)

159 israel*.ti,ab,in,ad. (659027)

160 (Jerusalem* or "Northern District" or "Nof Hagalil" or Safed or "Safed's" or Tzfat* or Kinneret* or "yizre'el" or Jezreel* or Akka or "Akka's" or Akko or "Akko's" or "Acre Subdistrict" or Golan or "Golan's" or Haifa or Haifa's or Hadera or Hadera's or Central District or Ramla or Ramla's or HaSharon* or Netanya* or Petah Tikva* or Rehovot* or Tel Aviv* or Gush Dan* or West Bank or West Bank's or Southern District or Beersheba* or Be'er Sheva or Be'er Sheva's or Ashkelon* or Ashdod* or Omer or Omer's or Meitar or Meitar's or Lehavim* or Sderot* or Netivot* or Ofakim* or Ashkelon* or Ariel or Ariel's or Modi'in Illit or "the Territories").ti,ab,in,ad. (490990)

161 ("Judea and Samaria" or "Judea and Samaria's").ti,ab,in,ad. (329)

162 or/158-161 [ISRAEL GEOGRAPHIC FILTER] (761632)

163 145 and 162 [COVID-19 - ISRAEL] (855)

164 157 or 163 [COVID-19 - UK & ISRAEL] (4738)

165 129 or 164 [COVID-19 - VACCINATED POPS, UK, ISRAEL] (9550)

166 immunoassay/ (104765)

167 antibody detection/ (44553)

168 coronavirus disease 2019/di [diagnosis] (17103)

169 coronavirus infection/di [diagnosis] (8919)

170 ((COVID or COVID-19 or COVID19) adj3 (assay? or immunoassay? or immuno-assay? or detect* or diagnos* or screen* or test*)).tw,kw. (20114)

171 ((coronavirus* or corona virus*) adj3 (assay? or immunoassay? or immuno-assay? or detect* or diagnos* or screen* or test*)).tw,kw. (4326)

172 ((2019-nCoV or 19nCoV or 2019nCoV or nCoV or n-CoV or "CoV 2" or CoV2) adj3 (assay? or immunoassay? or immuno-assay? or detect* or diagnos* or screen* or test*)).tw,kw. (12376)

- 173 ((SARS-CoV-2 or SARS-CoV2 or SARSCoV-2 or SARSCoV2 or SARS2 or SARS-2 or severe acute respiratory syndrome coronavirus 2) adj3 (assay? or immunoassay? or immuno-assay? or detect* or diagnos* or screen* or test*)).tw,kw. (15225)
- 174 (("B.1.1.7" or "B.1.351" or "B.1.617" or "B.1.427" or "B.1.429") adj3 (assay? or immunoassay? or immuno-assay? or detect* or diagnos* or screen* or test*)).tw,kw. (49)
- 175 ("P.1" adj3 (assay? or immunoassay? or immuno-assay? or detect* or diagnos* or screen* or test*)).tw,kw. (1469)
- 176 ((alpha or beta or delta or gamma) adj3 variant? adj3 (assay? or immunoassay? or immuno-assay? or detect* or diagnos* or screen* or test*)).tw,kw. (308)
- 177 screening/ (297136)
- 178 mass screening/ (170181)
- 179 screening.tw,kw. (1388019)
- 180 ((mass or population*) adj3 (screen* or test*)).tw,kw. (94441)
- 181 (screen* or detect* or identif* or recogni*).ti,kw. (2260233)
- 182 ((early or earlier or earliest or ongoing or regular*) adj5 (screen* or detect* or identif* or recogni*)).tw,kw. (521869)
- 183 (case finding? or casefinding?).tw,kw. (13824)
- 184 point of care testing/ (18210)
- 185 ((point-of-care or bedside? or bed side? or POC or rapid*) adj3 (assay? or immunoassay? or immuno-assay? or detect* or diagnos* or screen* or test*)).tw,kw. (224950)
- 186 (field adj3 (assay? or immunoassay? or immuno-assay? or detect* or diagnos* or screen* or test*)).tw,kw. (74480)
- 187 POCT.tw,kw. (4978)
- 188 ((antibody or antibodies or anti-bod* or antigen* or serologic*) adj3 (assay? or immunoassay? or immuno-assay? or test*)).tw,kw. (214162)
- 189 (serodiagnos* or sero-diagnos* or serologic* diagnos*).tw,kw. (26401)
- 190 or/166-189 [TESTING] (4048619)
- 191 165 and 190 [COVID-19 - VACCINATED POPS, UK, ISRAEL - TESTING] (1838)
- 192 exp animal/ or exp animal experimentation/ or exp animal model/ or exp animal experiment/ or nonhuman/ or exp vertebrate/ (55446922)
- 193 exp human/ or exp human experimentation/ or exp human experiment/ (43105453)
- 194 192 not 193 (12343341)
- 195 191 not 194 [ANIMAL-ONLY REMOVED] (1469)
- 196 limit 195 to yr="2020-current" (1333)
- 197 196 use emczd [EMBASE RECORDS] (624)
- 198 97 or 197 [BOTH DATABASES] (1307)
- 199 remove duplicates from 198 (900) [TOTAL UNIQUE RECORDS]
- 200 199 use medall [MEDLINE UNIQUE RECORDS] (667)
- 201 199 use emczd [EMBASE UNIQUE RECORDS] (233)

Web of Science

35 564 #33 NOT #34
 Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH,
 ESCI Timespan=All years

- # 34 3,182,074 TI=(animal or animals or mice or mouse or rat or rats or lamb or lambs or sheep or murine or cow or cows or cattle or bovine or piglet* or pig or pigs or hog or hogs horse or horses or equine or dog or dogs or canine or cat or cats or feline or rabbit or rabbits or monkey or monkeys or chimpanzee*)
Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI Timespan=All years
- # 33 585 #31 AND #22
Refined by: PUBLICATION YEARS: (2021 OR 2020)
Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI Timespan=All years
- # 32 697 #31 AND #22
Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI Timespan=All years
- # 31 3,192,949 #30 OR #29 OR #28 OR #27 OR #26 OR #25 OR #24 OR #23
Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI Timespan=All years
- # 30 12,445 TS=(serodiagnos* or (sero NEAR/0 diagnos*) or (serologic* NEAR/0 diagnos*))
Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI Timespan=All years
- # 29 92,689 TS=((antibody or antibodies or "anti-body" or "anti-bodies" or antigen* or serologic*) NEAR/3 (assay* or immunoassay* or "immuno-assay" or test*))
Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI Timespan=All years
- # 28 2,150 TS=POCT
Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI Timespan=All years
- # 27 126,486 TS=(field NEAR/3 assay*) OR TS=(field NEAR/3 immunoassay*) OR TS=(field NEAR/3 "immuno-assay") OR TS=(field NEAR/3 "immuno-assays") OR TS=(field NEAR/3 detect*) OR TS=(field NEAR/3 diagnos*) OR TS=(field NEAR/3 screen*) OR TS=(field NEAR/3 test*)
Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI Timespan=All years
- # 26 142,381 TS(("point-of-care" or bedside* or "bed side" or "bed sides" or POC or rapid*) NEAR/3 as say*) OR TS(("point-of-care" or bedside* or "bed side" or "bed sides" or POC or rapid*) NEAR/3 immunoassay*) OR TS(("point-of-care" or bedside* or "bed side" or "bed sides" or POC or rapid*) NEAR/3 "immuno-assay") OR TS(("point-of-care" or bedside* or "bed side" or "bed sides" or POC or rapid*) NEAR/3 "immuno-assays") OR TS(("point-of-care" or bedside* or "bed side" or "bed sides" or POC or rapid*) NEAR/3 detect*) OR TS(("point-of-care" or bedside* or "bed side" or "bed sides" or POC or rapid*) NEAR/3 di



agnos*) OR TS=(("point-of-care" or bedside* or "bed side" or "bed sides" or POC or rapid*) NEAR/3 screen*) OR TS=(("point-of-care" or bedside* or "bed side" or "bed sides" or POC or rapid*) NEAR/3 test*)

Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI Timespan=All years

25 2,940,187

TOPIC: (screening) OR TOPIC: ((mass or population*) NEAR/3 (screen* or test*)) OR TITLE: (screen* or detect* or identif* or recogni*) OR TOPIC: ((early or earlier or earliest or ongoing or regular*) NEAR/5 (screen* or detect* or identif* or recogni*)) OR TOPIC: ("case finding" or "case findings" or casefinding*)

Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI Timespan=All years

24 9,256

TS=((COVID or "COVID-19" or COVID19) NEAR/3 detect*) OR TS=((coronavirus* or "corona virus" or "corona viruses") NEAR/3 detect *) OR TS=((("2019-nCoV" or nCoV or "n-CoV" or "SARS-CoV-2" or "SARS-CoV2" or "SARSCoV-2" or SARSCoV2 or SARS2) NEAR/3 detect *) OR TS=((BNT162 or BNT162

-01 or BNT162a1 or BNT162b1 or BNT162b2 or BNT162c2) NEAR/3 detect*) OR TS=((("B.1.1.7" or "B.1.351" or "B.1.617" or "B.1.427" or "B.1.429") NEAR/3 detect*) OR TS=("P.1" NEAR/3 detect*) OR TS=((("alpha variant" or "alpha variants" or "beta variant" or "beta variants" or "delta variant" or "delta variants" or "gamma variant" or "gamma variants") NEAR/3 detect*) OR TS=((COVID

D or "COVID-19" or COVID19) NEAR/3 diagnos*) OR TS=((coronavirus* or "corona virus" or "corona viruses") NEAR/3 diagnos*) OR TS=((("2019-nCoV" or nCoV or "n-CoV" or "SARS-CoV-2" or "SARS-CoV2" or "SARSCoV-2" or SARSCoV2 or SARS2) NEAR/3 diagnos*) OR TS=((BNT162 or BNT162

-01 or BNT162a1 or BNT162b1 or BNT162b2 or BNT162c2) NEAR/3 diagnos*) OR TS=((("B.1.1.7" or "B.1.351" or "B.1.617" or "B.1.427" or "B.1.429") NEAR/3 diagnos*) OR TS=("P.1" NEAR/3 diagnos*) OR TS=((("alpha variant" or "alpha variants" or "beta variant" or "beta variants" or "delta variant" or "delta variants" or "gamma variant" or "gamma variants") NEAR/3 diagnos*) OR TS

=((COVID or "COVID-19" or COVID19) NEAR/3 screen*) OR TS=((coronavirus* or "corona virus" or "corona viruses") NEAR/3 screen*) OR TS=((("2019-nCoV" or nCoV or "n-CoV" or "SARS-CoV-2" or "SARS-CoV2" or "SARSCoV-2" or SARSCoV2 or SARS2) NEAR/3 screen*) OR TS=((BNT162 or BNT162-

01 or BNT162a1 or BNT162b1 or BNT162b2 or BNT162c2) NEAR/3 screen*) OR TS=((("B.1.1.7" or "B.1.351" or "B.1.617" or "B.1.427" or "B.1.429") NEAR/3 screen*) OR TS=("P.1" NEAR/3 screen*) OR TS=((("alpha variant" or "alpha variants" or "beta variant" or "beta variants" or "delta variant" or "delta variants" or "gamma variant" or "gamma variants") NEAR/3 screen*)

Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI Timespan=All years

23 7,880

TS=((COVID or "COVID-19" or COVID19) NEAR/3 test*) OR TS=((coronavirus* or "corona virus" or "corona viruses") NEAR/3 test*) OR TS=(("2019-nCoV" or nCoV or "n-CoV" or "SARS-CoV-2" or "SARS-CoV2" or "SARSCoV-2" or SARSCoV2 or SARS2) NEAR/3 test*) OR TS=((BNT162 or BNT162-01 or BNT162a1 or BNT162b1 or BNT162b2 or BNT162c2) NEAR/3 test*) OR TS=(("B.1.1.7" or "B.1.351" or "B.1.617" or "B.1.427" or "B.1.429") NEAR/3 test*) OR TS=("P.1" NEAR/3 test*) OR TS=(("alpha variant" or "alpha variants" or "beta variant" or "beta variants" or "delta variant" or "delta variants" or "gamma variant" or "gamma variants") NEAR/3 test*) OR TS=((COVID or "COVID-19" or COVID19) NEAR/3 assay*) OR TS=((coronavirus* or "corona virus" or "corona viruses") NEAR/3 assay*) OR TS=(("2019-nCoV" or nCoV or "n-CoV" or "SARS-CoV-2" or "SARS-CoV2" or "SARSCoV-2" or SARSCoV2 or SARS2) NEAR/3 assay*) OR TS=((BNT162 or BNT162-01 or BNT162a1 or BNT162b1 or BNT162b2 or BNT162c2) NEAR/3 assay*) OR TS=(("B.1.1.7" or "B.1.351" or "B.1.617" or "B.1.427" or "B.1.429") NEAR/3 assay*) OR TS=("P.1" NEAR/3 assay*) OR TS=(("alpha variant" or "alpha variants" or "beta variant" or "beta variants" or "delta variant" or "delta variants" or "gamma variant" or "gamma variants") NEAR/3 assay*) OR TS=((COVID or "COVID-19" or COVID19) NEAR/3 immunoassay*) OR TS=((coronavirus* or "corona virus" or "corona viruses") NEAR/3 immunoassay*) OR TS=(("2019-nCoV" or nCoV or "n-CoV" or "SARS-CoV-2" or "SARS-CoV2" or "SARSCoV-2" or SARSCoV2 or SARS2) NEAR/3 immunoassay*) OR TS=((BNT162 or BNT162-01 or BNT162a1 or BNT162b1 or BNT162b2 or BNT162c2) NEAR/3 immunoassay*) OR TS=(("B.1.1.7" or "B.1.351" or "B.1.617" or "B.1.427" or "B.1.429") NEAR/3 immunoassay*) OR TS=("P.1" NEAR/3 immunoassay*) OR TS=(("alpha variant" or "alpha variants" or "beta variant" or "beta variants" or "delta variant" or "delta variants" or "gamma variant" or "gamma variants") NEAR/3 immunoassay*) OR TS=((COVID or "COVID-19" or COVID19) NEAR/3 "immuno-assay") OR TS=((coronavirus* or "corona virus" or "corona viruses") NEAR/3 "immuno-assay") OR TS=(("2019-nCoV" or nCoV or "n-CoV" or "SARS-CoV-2" or "SARS-CoV2" or "SARSCoV-2" or SARSCoV2 or SARS2) NEAR/3 "immuno-assay") OR TS=((BNT162 or BNT162-01 or BNT162a1 or BNT162b1 or BNT162b2 or BNT162c2) NEAR/3 "immuno-assay") OR TS=(("B.1.1.7" or "B.1.351" or "B.1.617" or "B.1.427" or "B.1.429") NEAR/3 "immuno-assay") OR TS=("P.1" NEAR/3 "immuno-assay") OR TS=(("alpha variant" or "alpha variants" or "beta variant" or "beta variants" or "delta variant" or "delta variants" or "gamma variant" or "gamma variants") NEAR/3 "immuno-assay")

Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI Timespan=All years



- # 22 3,506 #21 OR #5
Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI Timespan=All years
- # 21 1,871 (#20 OR #15) AND #10
Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI Timespan=All years
- # 20 787,758 #19 OR #18 OR #17 OR #16
Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI Timespan=All years
- # 19 59 TOPIC: (("Judea and Samaria" or "Judea and Samaria's")) OR ADDRESS: (("Judea and Samaria" or "Judea and Samaria's"))
Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI Timespan=All years
- # 18 496,900 ADDRESS: ((Jerusalem* or "Northern District" or "Nof Hagalil" or Safed or "Safed's" or Tzfat* or Kinneret* or "yizre'el" or Jezreel* or Akka or "Akka's" or Akko or "Akko's" or "Acre Subdistrict" or Golan or "Golan's" or Haifa or "Haifa's" or Hadera or "Hadera's" or "Central District" or Ramla or "Ramla's" or HaSharon* or Netanya* or "Petah Tikva" or Rehovot* or "Tel Aviv" or "Gush Dan" or "West Bank" or "West Bank's" or "Southern District" or Beersheba* or "Be'er Sheva" or "Be'er Sheva's" or Ashkelon* or Ashdod* or Omer or "Omer's" or Meitar or "Meitar's" or Lehavim* or Sderot* or Netivot* or Ofakim* or Ashkelon* or Ariel or "Ariel's" or "Modi'in Illit" or "the Territories"))
Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI Timespan=All years
- # 17 30,253 TS=(Jerusalem* or "Northern District" or "Nof Hagalil" or Safed or "Safed's" or Tzfat* or Kinneret* or "yizre'el" or Jezreel* or Akka or "Akka's" or Akko or "Akko's" or "Acre Subdistrict" or Golan or "Golan's" or Haifa or "Haifa's" or Hadera or "Hadera's" or "Central District" or Ramla or "Ramla's" or HaSharon* or Netanya* or "Petah Tikva" or Rehovot* or "Tel Aviv" or "Gush Dan" or "West Bank" or "West Bank's" or "Southern District" or Beersheba* or "Be'er Sheva" or "Be'er Sheva's" or Ashkelon* or Ashdod* or Omer or "Omer's" or Meitar or "Meitar's" or Lehavim* or Sderot* or Netivot* or Ofakim* or Ashkelon* or Ariel or "Ariel's" or "Modi'in Illit" or "the Territories")
Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI Timespan=All years
- # 16 763,295 TOPIC: (israel*) OR ADDRESS: (israel*)
Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI Timespan=All years
- # 15 7,690,560 #14 OR #13 OR #12 OR #11
Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI Timespan=All years
- # 14 63,726 TS=(bangor or "bangor's" or cardiff or "cardiff's" or newport or "newport's" or st asaph or "st asaph's" or st davids or swansea or "swansea's") OR TS=(aberdeen or "aberdeen's" or dundee or "dundee's" or edinburgh or "edinburgh's" or glasgow or "glasgow's" or inverness or (perth not australia*) or ("perth's" not



- australia*) or stirling or "stirling's") OR TS=(armagh or "armagh's" or belfast or "belfast's" or lisburn or "lisburn's" or londonderry or "londonderry's" or derry or "derry's" or newry or "newry's")
Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI Timespan=All years
- # 13 7,478,476 TS=(gb or "g.b." or britain* or (british* not "british columbia") or uk or "u.k." or "united kingdom" or (england* not "new england") or "northern ireland" or "northern irish" or scotland* or scottish* or ((wales or "south wales") not "new south wales") or welsh*) OR TS=(bath or "bath's" or ((birmingham not alabama*) or ("birmingham's" not alabama*) or bradford or "bradford's" or brighton or "brighton's" or bristol or "bristol's" or carlisle* or "carlisle's" or (cambridge not (massachusetts* or boston* or harvard*)) or ("cambridge's" not (massachusetts* or boston* or harvard*)) or (canterbury not zealand*) or ("canterbury's" not zealand*) or chelmsford or "chelmsford's" or chester or "chester's" or chichester or "chichester's" or coventry or "coventry's" or derby or "derby's" or (durham not (carolina* or nc)) or ("durham's" not (carolina* or nc)) or ely or "ely's" or exeter or "exeter's" or gloucester or "gloucester's" or hereford or "hereford's" or hull or "hull's" or lancaster or "lancaster's" or leeds* or leicester or "leicester's" or (lincoln not nebraska*) or ("lincoln's" not nebraska*) or (liverpool not ("new south wales" or nsw)) or ("liverpool's" not ("new south wales" or nsw)) or ((london not (ontario* or ont or toronto*)) or ("london's" not (ontario* or ont or toronto*)) or manchester or "manchester's" or (newcastle not ("new south wales" or nsw)) or ("newcastle's" not ("new south wales" or nsw)) or norwich or "norwich's" or nottingham or "nottingham's" or oxford or "oxford's" or peterborough or "peterborough's" or plymouth or "plymouth's" or portsmouth or "portsmouth's" or preston or "preston's" or ripon or "ripon's" or salford or "salford's" or salisbury or "salisbury's" or sheffield or "sheffield's" or southampton or "southampton's" or st albans or stoke or "stoke's" or sunderland or "sunderland's" or truro or "truro's" or wakefield or "wakefield's" or wells or westminster or "westminster's" or winchester or "winchester's" or wolverhampton or "wolverhampton's" or (worchester not (massachusetts* or boston* or harvard*)) or ("worchester's" not (massachusetts* or boston* or harvard*)) or (york not ("new york" or ny or ontario* or ont or toronto*)) or ("york's" not ("new york" or ny or ontario* or ont or toronto*)))))
Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI Timespan=All years
- # 12 187,589 TS=(english) NOT TS=((published or publication* or translat* or written or language* or speak* or literature or citation*) NEAR/5 english)
Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI Timespan=All years
- # 11 41,929 TS=("national health service" or nhs)
Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI Timespan=All years
- # 10 10,163 #9 OR #8 OR #7 OR #6



- Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI Timespan=All years
- # 9 368 TOPIC: ((mRNA or "messenger RNA") NEAR/3 vaccin*) AND TOPIC: ("COVID-19" or COVID19 or coronavirus* or "corona virus" or "corona viruses" or "2019-nCoV" or nCoV or "n-CoV" or "SARS-CoV-2" or "SARS-CoV2" or "SARSCoV-2" or SARSCoV2 or SARS2)
Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI Timespan=All years
- # 8 6 TOPIC: (N38TVC63NU or Covishield* or B5S3K2V0G8 or EPK39PL4R4 or "hAdOx1 nCoV-19")
Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI Timespan=All years
- # 7 310 TOPIC: (BNT162 or "BNT162-01" or BNT162a1 or BNT162b1 or BNT162b2 or BNT162c2 or AZD1222 or ChAdOx1 or "mRNA-1273" or "LV-SMENP-DC" or "Ad5-nCoV " or "Ad26.COV2.S" or Ad26COVS1 or JNJ 78436735 or JNJ-78436735 or JT2NS6183B) AND TOPIC: (vaccin*)
Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI Timespan=All years
- # 6 10,060 TOPIC: (((("COVID-19" or COVID19) NEAR/5 (immun* or inoculat* or vaccin*))) OR TOPIC: (((coronavirus* or "corona virus" or "corona viruses") NEAR/5 (immun* or inoculat* or vaccin*))) OR TOPIC: (((("2019-nCoV" or nCoV or "n-CoV" or "SARS-CoV-2" or "SARS-CoV2" or "SARSCoV-2" or SARSCoV2 or SARS2) NEAR/5 (immun* or inoculat* or vaccin*)))
Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI Timespan=All years
- # 5 1,969 #4 AND #3
Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI Timespan=All years
- # 4 232,087 TS=(vaccinated or inoculated or immunised or immunized) OR TS=(post NEAR/0 (vaccinat* or inoculat* or immuni*) OR TS=((after or already or full or fully or post or received) NEAR/3 (immunis* or immuniz* or immunity or inoculat* or vaccin*) OR TS=(status* NEAR/3 (immunis* or immuniz* or immunity or inoculat* or vaccin*))
Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI Timespan=All years
- # 3 164,256 #2 OR #1
Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI Timespan=All years
- # 2 16,183 TS=("B.1.1.7" or "B.1.351" or "B.1.617" or "B.1.427" or "B.1.429") OR TS=("P.1" and (Brazil* or variant*) OR TS=((alpha or beta or delta or gamma) NEAR/3 variant*))
Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI Timespan=All years
- # 1 148,233 TS=("COVID-19" or COVID19) OR TS=((coronavirus* or corona virus*) and (hubei or wuhan

or beijing or shanghai)) OR TS="Wuhan virus" OR TS=("2019-nCoV" or 19nCoV or 2019nCoV or nCoV or "n-CoV" or "CoV 2" or CoV2) OR TS=("SARS-CoV-2" or "SARS-CoV2" or "SARSCoV-2" or SARSCoV2 or SARS2 or "SARS-2" or "severe acute respiratory syndrome coronavirus 2") OR TS=("2019-novel CoV" or "Sars-coronavirus2" or "Sars-coronavirus-2" or "SARS-like coronavirus") OR TS=("novel coronavirus" or "novel corona virus" or "novel CoV") OR TI=((coronavirus* or "corona virus") AND ("2019" or "19")) OR TS=("coronavirus 2" or "corona virus 2" or "coronavirus 2019" or "coronavirus 19") OR TS=(OC43 or NL63 or 229E or HKU1 or HCoV* or "Sars-coronavirus") OR TI=(coronavirus* or "corona virus" or "corona viruses")
Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI Timespan=All years

Cochrane Library

-	+	#1	("COVID-19" or COVID19):ti,ab,kw	Limits	5634
-	+	#2	((coronavirus* or corona virus*) and (hubei or wuhan or beijing or shanghai)):ti,ab,kw	Limits	192
-	+	#3	"Wuhan virus":ti,ab,kw	Limits	0
-	+	#4	("2019-nCoV" or 19nCoV or 2019nCoV or nCoV or "n-CoV" or "CoV 2" or CoV2):ti,ab,kw	Limits	581
-	+	#5	("SARS-CoV-2" or "SARS-CoV2" or "SARSCoV-2" or SARSCoV2 or SARS2 or "SARS-2" or "severe acute respiratory syndrome coronavirus 2"):ti,ab,kw	Limits	2354
-	+	#6	("2019-novel CoV" or "Sars-coronavirus2" or "Sars-coronavirus-2" or "SARS-like coronavirus"):ti,ab,kw	Limits	16
-	+	#7	("novel coronavirus" or "novel corona virus" or "novel CoV"):ti,ab,kw	Limits	426
-	+	#8	((coronavirus* or "corona virus") AND ("2019" or "19")):ti	Limits	464
-	+	#9	("coronavirus 2" or "corona virus 2" or "coronavirus 2019" or "coronavirus 19"):ti,ab,kw	Limits	572
-	+	#10	(OC43 or NL63 or 229E or HKU1 or HCoV* or "Sars-coronavirus"):ti,ab,kw	Limits	75
-	+	#11	(coronavirus* or "corona virus" or "corona viruses"):ti	Limits	665
-	+	#12	("B.1.1.7" or "B.1.351" or "B.1.617" or "B.1.427" or "B.1.429"):ti,ab,kw	Limits	3
-	+	#13	("P.1" and (Brazil* or variant*)):ti,ab,kw	Limits	161
-	+	#14	((alpha or beta or delta or gamma) NEAR/3 variant*):ti,ab,kw	Limits	38
-	+	#15	{or #1-#14}	Limits	6083
-	+	#16	(vaccinated or inoculated or immunised or immunized):ti,ab,kw	Limits	5390
-	+	#17	(post NEXT (vaccinat* or inoculat* or immun*)):ti,ab,kw	Limits	1732
-	+	#18	((after or already or full or fully or post or received) NEAR/3 (immunis* or immuniz* or immunity or inoculat* or vaccin*)):ti,ab,kw	Limits	9328
-	+	#19	(status* NEAR/3 (immunis* or immuniz* or immunity or inoculat* or vaccin*)):ti,ab,kw	Limits	505
-	+	#20	{or #16-#19}	Limits	12451
-	+	#21	#15 AND #20	Limits	198
-	+	#22	("COVID-19" or COVID19) NEAR/5 (immun* or inoculat* or vaccin*):ti,ab,kw	Limits	446
-	+	#23	((coronavirus* or "corona virus" or "corona viruses") NEAR/5 (immun* or inoculat* or vaccin*)):ti,ab,kw	Limits	113
-	+	#24	("2019-nCoV" or nCoV or "n-CoV" or "SARS-CoV-2" or "SARS-CoV2" or "SARSCoV-2" or SARSCoV2 or SARS2) NEAR/5 (immun* or inoculat* or vaccin*)):ti,ab,kw	Limits	202



-	+	#25	((BNT162 or "BNT162-01" or BNT162a1 or BNT162b1 or BNT162b2 or BNT162c2 or AZD1222 or ChAdOx1 or "mRNA-1273" or "LV-SMENP-DC" or "Ad5-nCoV" or "Ad26.COV2.S" or Ad26COVS1 or JUV 78436735 or JN1-78436735 or JT2NS6183B) and <u>vaccin</u>):ti,ab,kw	Limits	82
-	+	#26	(N38TVCB3MIU or <u>Covishield</u> * or B5S3K2V0G8 or EPK39PL4R4 or "hAdOx1 nCoV-19"):ti,ab,kw	Limits	1
-	+	#27	((("mRNA or "messenger RNA") NEAR/3 <u>vaccin</u>) and ("COVID-19" or COVID19 or coronavirus* or "corona virus" or "corona viruses" or "2019-nCoV" or <u>nCoV</u> or "nCoV" or "SARS-CoV-2" or "SARS-CoV2" or "SARSCoV-2" or SARSCoV2 or SARS2)):ti,ab,kw	Limits	26
-	+	#28	{or #22-#27}	Limits	618
-	+	#29	("national health service" or <u>nhs</u>):ti,ab,kw	Limits	5003
-	+	#30	<u>english</u> NOT ((published or publication* or <u>translat</u> * or written or language* or speak* or literature or citation*) NEAR/5 <u>english</u>):ti,ab,kw	Limits	3269
-	+	#31	(gb or "g.b." or britain* or (<u>british</u> * not (<u>british columbia</u> *) or uk or "u.k." or "united kingdom" or (<u>england</u> * not "new england") or "northern ireland" or "northern irish" or <u>scotland</u> * or <u>scottish</u> * or ((wales or "south wales") not "new south wales") or wales*) OR TS=(bath* or "bath's" or (<u>brampton</u> not alabama) or (<u>birmingham</u> * not alabama) or <u>bradford</u> * or <u>bradford's</u> * or <u>brighton</u> * or <u>brighton's</u> * or <u>bristol</u> * or <u>bristol's</u> * or <u>carlisle</u> * or "carlises" or (<u>cambridge</u> not (<u>massachusetts</u> * or boston* or harvard*)) or ("cambridge's" not (<u>massachusetts</u> * or boston* or harvard*)) or (<u>canterbury</u> not zealand) or (<u>canterbury's</u> not zealand) or <u>chelmsford</u> * or <u>chelmsford's</u> * or <u>chester</u> * or <u>chester's</u> * or <u>chichester</u> * or <u>chichester's</u> * or <u>coventry</u> * or <u>coventry's</u> * or derby or derby's or (<u>durham</u> not (<u>carolina</u> * or nc*)) or ("durham's" not (<u>carolina</u> * or nc*)) or <u>ely</u> * or <u>ely's</u> * or <u>exeter</u> * or <u>exeter's</u> * or <u>gloucester</u> * or <u>gloucester's</u> * or <u>hereford</u> * or <u>hereford's</u> * or hull or hulls* or <u>lancaster</u> * or <u>lancaster's</u> * or <u>leeds</u> * or <u>leicester</u> * or <u>leicester's</u> * or (<u>lincoln</u> not nebraska) or (<u>lincoln's</u> not nebraska) or (<u>liverpool</u> not ("new south wales" or nsw)) or (<u>liverpool's</u> not ("new south wales" or nsw)) or (<u>london</u> not (<u>ontario</u> * or ont* or <u>toronto</u> *) or ("london's" not (<u>ontario</u> * or ont* or <u>toronto</u> *) or <u>manchester</u> * or <u>manchester's</u> * or (<u>newcastle</u> not ("new south wales" or nsw)) or (<u>newcastle's</u> not ("new south wales" or nsw)) or <u>norwich</u> * or <u>norwich's</u> * or <u>nottingham</u> * or <u>nottingham's</u> * or oxford or "oxford's" or <u>peterborough</u> * or <u>peterborough's</u> * or <u>plymouth</u> * or <u>plymouth's</u> * or <u>portsmouth</u> * or <u>portsmouth's</u> * or <u>preston</u> * or <u>preston's</u> * or <u>ripon</u> * or <u>ripon's</u> * or <u>salford</u> * or <u>salford's</u> * or <u>salisbury</u> * or <u>salisbury's</u> * or <u>sheffield</u> * or <u>sheffield's</u> * or southampton or "southampton's" or st albans or stoke or "stoke's" or <u>sunderland</u> * or <u>sunderland's</u> * or <u>truro</u> * or <u>truro's</u> * or <u>wakefield</u> * or <u>wakefield's</u> * or wells or westminster or "westminster's" or <u>winchester</u> * or <u>winchester's</u> * or <u>wolverhampton</u> * or <u>wolverhampton's</u> * or (<u>worcester</u> not (<u>massachusetts</u> * or boston* or harvard*)) or ("worcester's" not (<u>massachusetts</u> * or boston* or harvard*))	Limits	157217
-	+	#32	<u>aberdeen</u> * or <u>aberdeen's</u> * or <u>dundee</u> * or <u>dundee's</u> * or edinburgh or <u>edinburgh's</u> * or glasgow or <u>glasgow's</u> * or <u>inverness</u> * or (<u>perth</u> not australia) or ("perth's" not australia) or <u>stirling</u> * or <u>stirling's</u> * or <u>armagh</u> * or <u>armagh's</u> * or belfast or <u>belfast's</u> * or <u>lisburn</u> * or <u>lisburn's</u> * or <u>londonderry</u> * or <u>londonderry's</u> * or <u>derry</u> * or <u>derry's</u> * or <u>newry</u> * or <u>newry's</u>):ti,ab,kw	Limits	6851
-	+	#33	{or #29-#32}	Limits	165654
-	+	#34	<u>israel</u> *:ti,ab,kw	Limits	2147
-	+	#35	(Jerusalem* or "Northern District" or "Not HeGalil" or <u>Safed</u> * or <u>Safeds</u> * or <u>Tzfat</u> * or <u>Kinneret</u> * or <u>Vizre</u> * or <u>Jezeel</u> * or <u>Akka</u> * or <u>Akka's</u> * or <u>Akko</u> * or "Akko's" or "Acre Subdistrict" or Golan or "Golan's" or Haifa or "Haifa's" or <u>Hadera</u> * or <u>Hadera's</u> * or "Central District" or Ramla or "Ramla's" or <u>HaSharon</u> * or <u>Netanya</u> * or <u>Petah Tikva</u> * or <u>Rehovot</u> * or "Tel Aviv" or "Gush Dan" or "West Bank" or "West Bank's" or "Southern District" or <u>Beersheba</u> * or "Be'er Sheva" or "Be'er Sheva's" or <u>Ashkelon</u> * or <u>Ashdod</u> * or <u>Omer</u> * or <u>Omer's</u> * or <u>Metar</u> * or <u>Metar's</u> * or <u>Lehavim</u> * or <u>Sderot</u> * or <u>Netivot</u> * or <u>Qafqim</u> *)	Limits	486
-	+	#36	("Judea and Samaria" or "Judea and <u>Samaras</u>):ti,ab,kw	Limits	0
-	+	#37	{or #34-#36}	Limits	2425
-	+	#38	(#33 OR #37) AND #28	Limits	63
-	+	#39	#21 or #38	Limits	240
-	+	#40	((<u>COVID</u> or "COVID-19" or COVID19) NEAR/3 test*):ti,ab,kw	Limits	342

-	+	#41	((coronavirus* or "corona virus" or "corona viruses") NEAR/3 test):ti,ab,kw	Limits	40
-	+	#42	((2019-nCoV or nCoV or "n-CoV" or "SARS-CoV-2" or "SARS-CoV2" or "SARSCoV-2" or SARSCoV2 or SARS2) NEAR/3 test):ti,ab,kw	Limits	136
-	+	#43	((BNT162 or "BNT162-01" or BNT162a1 or BNT162b1 or BNT162b2 or BNT162c2) NEAR/3 test):ti,ab,kw	Limits	0
-	+	#44	(("B.1.1.7" or "B.1.351" or "B.1.617" or "B.1.427" or "B.1.429" or "P.1") NEAR/3 test):ti,ab,kw	Limits	53
-	+	#45	((alpha variant" or "alpha variants" or "beta variant" or "beta variants" or "delta variant" or "delta variants" or "gamma variant" or "gamma variants") NEAR/3 test):ti,ab,kw	Limits	0
-	+	#46	((COVID or "COVID-19" or COVID19) NEAR/3 assay):ti,ab,kw	Limits	4
-	+	#47	((coronavirus* or "corona virus" or "corona viruses") NEAR/3 assay):ti,ab,kw	Limits	0
-	+	#48	((2019-nCoV or nCoV or "n-CoV" or "SARS-CoV-2" or "SARS-CoV2" or "SARSCoV-2" or SARSCoV2 or SARS2) NEAR/3 assay):ti,ab,kw	Limits	12
-	+	#49	((BNT162 or "BNT162-01" or BNT162a1 or BNT162b1 or BNT162b2 or BNT162c2) NEAR/3 assay):ti,ab,kw	Limits	0
-	+	#50	(("B.1.1.7" or "B.1.351" or "B.1.617" or "B.1.427" or "B.1.429" or "P.1") NEAR/3 assay):ti,ab,kw	Limits	4
-	+	#51	((alpha variant" or "alpha variants" or "beta variant" or "beta variants" or "delta variant" or "delta variants" or "gamma variant" or "gamma variants") NEAR/3 assay):ti,ab,kw	Limits	0
-	+	#52	((COVID or "COVID-19" or COVID19) NEAR/3 immunoassay):ti,ab,kw	Limits	0
-	+	#53	((coronavirus* or "corona virus" or "corona viruses") NEAR/3 immunoassay):ti,ab,kw	Limits	0
-	+	#54	((2019-nCoV or nCoV or "n-CoV" or "SARS-CoV-2" or "SARS-CoV2" or "SARSCoV-2" or SARSCoV2 or SARS2) NEAR/3 immunoassay):ti,ab,kw	Limits	0
-	+	#55	((BNT162 or "BNT162-01" or BNT162a1 or BNT162b1 or BNT162b2 or BNT162c2) NEAR/3 immunoassay):ti,ab,kw	Limits	0
-	+	#56	(("B.1.1.7" or "B.1.351" or "B.1.617" or "B.1.427" or "B.1.429" or "P.1") NEAR/3 immunoassay):ti,ab,kw	Limits	0
-	+	#57	((alpha variant" or "alpha variants" or "beta variant" or "beta variants" or "delta variant" or "delta variants" or "gamma variant" or "gamma variants") NEAR/3 immunoassay):ti,ab,kw	Limits	0
-	+	#58	((COVID or "COVID-19" or COVID19) NEAR/3 immuno-assay):ti,ab,kw	Limits	0
-	+	#59	((coronavirus* or "corona virus" or "corona viruses") NEAR/3 immuno-assay):ti,ab,kw	Limits	0
-	+	#60	((2019-nCoV or nCoV or "n-CoV" or "SARS-CoV-2" or "SARS-CoV2" or "SARSCoV-2" or SARSCoV2 or SARS2) NEAR/3 immuno-assay):ti,ab,kw	Limits	0
-	+	#61	((BNT162 or "BNT162-01" or BNT162a1 or BNT162b1 or BNT162b2 or BNT162c2) NEAR/3 immuno-assay):ti,ab,kw	Limits	0
-	+	#62	(("B.1.1.7" or "B.1.351" or "B.1.617" or "B.1.427" or "B.1.429" or "P.1") NEAR/3 immuno-assay):ti,ab,kw	Limits	0
-	+	#63	((alpha variant" or "alpha variants" or "beta variant" or "beta variants" or "delta variant" or "delta variants" or "gamma variant" or "gamma variants") NEAR/3 immuno-assay):ti,ab,kw	Limits	0

-	+	#64	((COVID or "COVID-19" or COVID19) NEAR/3 detect*).ti,ab,kw	Limits	37
-	+	#65	((coronavirus* or "corona virus" or "corona viruses") NEAR/3 detect*).ti,ab,kw	Limits	19
-	+	#66	((("2019-nCoV" or nCoV or "n-CoV" or "SARS-CoV-2" or "SARS-CoV2" or "SARSCoV-2" or SARSCoV2 or SARS2) NEAR/3 detect*).ti,ab,kw	Limits	57
-	+	#67	((BNT162 or "BNT162-01" or BNT162a1 or BNT162b1 or BNT162b2 or BNT162c2) NEAR/3 detect*).ti,ab,kw	Limits	0
-	+	#68	((("B.1.1.7" or "B.1.351" or "B.1.617" or "B.1.427" or "B.1.429" or "P.1") NEAR/3 detect*).ti,ab,kw	Limits	5
-	+	#69	((("alpha variant" or "alpha variants" or "beta variant" or "beta variants" or "delta variant" or "delta variants" or "gamma variant" or "gamma variants") NEAR/3 detect*).ti,ab,kw	Limits	0
-	+	#70	((COVID or "COVID-19" or COVID19) NEAR/3 diagnos*).ti,ab,kw	Limits	585
-	+	#71	((coronavirus* or "corona virus" or "corona viruses") NEAR/3 diagnos*).ti,ab,kw	Limits	142
-	+	#72	((("2019-nCoV" or nCoV or "n-CoV" or "SARS-CoV-2" or "SARS-CoV2" or "SARSCoV-2" or SARSCoV2 or SARS2) NEAR/3 diagnos*).ti,ab,kw	Limits	51
-	+	#73	((BNT162 or "BNT162-01" or BNT162a1 or BNT162b1 or BNT162b2 or BNT162c2) NEAR/3 diagnos*).ti,ab,kw	Limits	0
-	+	#74	((("B.1.1.7" or "B.1.351" or "B.1.617" or "B.1.427" or "B.1.429" or "P.1") NEAR/3 diagnos*).ti,ab,kw	Limits	15
-	+	#75	((("alpha variant" or "alpha variants" or "beta variant" or "beta variants" or "delta variant" or "delta variants" or "gamma variant" or "gamma variants") NEAR/3 diagnos*).ti,ab,kw	Limits	0
-	+	#76	((COVID or "COVID-19" or COVID19) NEAR/3 screen*).ti,ab,kw	Limits	47
-	+	#77	((coronavirus* or "corona virus" or "corona viruses") NEAR/3 screen*).ti,ab,kw	Limits	0
-	+	#78	((("2019-nCoV" or nCoV or "n-CoV" or "SARS-CoV-2" or "SARS-CoV2" or "SARSCoV-2" or SARSCoV2 or SARS2) NEAR/3 screen*).ti,ab,kw	Limits	19
-	+	#79	((BNT162 or "BNT162-01" or BNT162a1 or BNT162b1 or BNT162b2 or BNT162c2) NEAR/3 screen*).ti,ab,kw	Limits	0
-	+	#80	((("B.1.1.7" or "B.1.351" or "B.1.617" or "B.1.427" or "B.1.429" or "P.1") NEAR/3 screen*).ti,ab,kw	Limits	4
-	+	#81	((("alpha variant" or "alpha variants" or "beta variant" or "beta variants" or "delta variant" or "delta variants" or "gamma variant" or "gamma variants") NEAR/3 screen*).ti,ab,kw	Limits	0
-	+	#82	screening.ti,ab,kw	Limits	58616
-	+	#83	((mass or population*) NEAR/3 (screen* or test*).ti,ab,kw	Limits	7277
-	+	#84	(screen* or detect* or identi* or recogni*).ti	Limits	23605
-	+	#85	((early or earlier or earliest or ongoing or regular*) NEAR/5 (screen* or detect* or identi* or recogni*).ti,ab,kw	Limits	10255
-	+	#86	("case finding" or "case findings" or casefinding*).ti,ab,kw	Limits	422
-	+	#87	((("point-of-care" or bedside* or "bed side" or "bed sides" or POC or rapid*) NEAR/3 (assay* or immunoassay* or immuno-assay* or detect* or diagnos* or screen* or test*).ti,ab,kw	Limits	4224
-	+	#88	(field NEAR/3 (assay* or immunoassay* or immuno-assay* or detect* or diagnos* or screen* or test*).ti,ab,kw	Limits	1538
-	+	#89	POCT.ti,ab,kw	Limits	144
-	+	#90	((antibody or antibodies or "anti-body" or "anti-bodies" or antigen* or serologic*) NEAR/3 (assay* or immunoassay* or immuno-assay* or test*).ti,ab,kw	Limits	3658
-	+	#91	(serodiagnos* or (sero NEAR/0 diagnos*) or (serologic* NEAR/0 diagnos*).ti,ab,kw	Limits	351
-	+	#92	{or #40-#91}	Limits	86655
-	+	#93	#39 AND #92	Limits	81

CDSR – 4 Reviews; 1 Protocol
CENTRAL – 76 Trials

Covid-END

<https://www.mcmasterforum.org/networks/covid-end/resources-to-support-decision-makers/Inventory-of-best-evidence-syntheses/public-health-measures>

Rapid Diagnostic Testing for COVID-19 in a fully vaccinated population



Reviewed all – nothing directly relevant to research questions

L-OVE Platform

<https://app.iloveevidence.com/>

"fully vaccinated" – 49 results

"post-vaccination" – 160 results

"vaccinated population" or "vaccinated populations" or "vaccinated individual" or "vaccinated individuals" or "vaccinated people" – 164 results

ClinicalTrials.gov (COVID-19 subset)

<https://clinicaltrials.gov/ct2/results?cond=COVID-19>

vaccinated – 153

"post vaccination" – 58

WHO COVID-19 Database

<https://search.bvsalud.org/global-literature-on-novel-coronavirus-2019-ncov/>

vaccinated OR inoculated or immunised or immunized or "post-vaccination" or "post-inoculation" or "post-immunised" or "post-immunized" or "after vaccination"

AND

diagnos* or test or tests or tested or testing or assay or assays or immunoassay or immunoassays or "immuno-assay" or "immuno-assays" or detect* or screen* or POCT or serodiagnos* or "sero-diagnosis" or "sero-diagnoses" or "sero-diagnostic" or "sero-diagnostics"

Clinical Aspect: Diagnosis or Prediction

57 records

Appendix B: Initial resources identified

Links from Jeremy Grimshaw:

<https://www.cochranelibrary.com/cdsr/doi/10.1002/14651858.CD013699/full>
<https://www.cochranelibrary.com/cdsr/doi/10.1002/14651858.CD013699/full>
<https://www.cochranelibrary.com/cdsr/doi/10.1002/14651858.CD013717.pub2/full>

From Health Canada:

Background

Pan-Canadian COVID-19 Testing and Screening Guidance: Technical guidance and implementation plan	https://www.canada.ca/en/health-canada/services/drugs-health-products/covid19-industry/medical-devices/testing/pan-canadian-guidance.html
COVID vaccination in Canada	https://health-infobase.canada.ca/covid-19/vaccination-coverage/

COVID-19 Test Performance Characteristics

COVID-19 Scientific Advisory Group Rapid Response Report	https://www.albertahealthservices.ca/assets/info/ppih/if-ppih-covid-19-sag-asymptomatic-transmission-rapid-review.pdf
Rapid antigen screening of asymptomatic people as a public health tool to combat COVID-19	https://www.cmaj.ca/content/193/13/E449
Clinical sensitivity and interpretation of PCR and serological COVID-19 diagnostics for patients presenting to the hospital	https://faseb.onlinelibrary.wiley.com/doi/10.1096/fj.202001700RR
Routine Asymptomatic SARS-CoV-2 Screen Testing of Ontario Long-Term Care Staff After COVID-19 Vaccination	https://covid19-sciencetable.ca/sciencebrief/routine-asymptomatic-sars-cov-2-screen-testing-of-ontario-long-term-care-staff-after-covid-19-vaccination/
SARS-CoV-2 Molecular Assay Evaluation: Results	https://www.finddx.org/covid-19/sarscov2-eval-molecular/molecular-eval-results/
Estimating the extent of asymptomatic COVID-19 and its potential for community transmission: Systematic review and meta-analysis	https://jammi.utpjournals.press/doi/pdf/10.3138/jammi-2020-0030

Rapid Diagnostic Testing for COVID-19 in a fully vaccinated population

Occurrence and transmission potential of asymptomatic and presymptomatic SARS-CoV-2 infections: A living systematic review and meta-analysis	https://journals.plos.org/plosmedicine/article?id=10.1371/journal.pmed.1003346
What do we know about SARS-CoV-2 transmission? A systematic review and meta-analysis of the secondary attack rate and associated risk factors	https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0240205
The diagnostic accuracy of isothermal nucleic acid point-of-care tests for human coronaviruses: A systematic review and meta-analysis	https://www.nature.com/articles/s41598-020-79237-7
Rethinking Covid-19 Test Sensitivity — A Strategy for Containment	https://www.nejm.org/doi/full/10.1056/NEJMp2025631
Public Health Ontario COVID-19 Laboratory Testing Q&As	https://www.publichealthontario.ca/-/media/documents/lab/covid-19-lab-testing-faq.pdf?la=en
Rapid, point-of-care antigen and molecular-based tests for diagnosis of SARS-CoV-2 infection	https://pubmed.ncbi.nlm.nih.gov/33760236/
Transmission of COVID-19 in 282 clusters in Catalonia, Spain: a cohort study	https://pubmed.ncbi.nlm.nih.gov/33545090/
At-Home Covid-19 Tests Might Cost Too Much for Regular Use	https://www.wsj.com/articles/at-home-covid-19-tests-might-cost-too-much-for-regular-use-11619602221

Evidence and International Approaches for Testing in Vaccinated Populations

Rapid Diagnostic Testing for COVID-19 in a fully vaccinated population

Interim Estimates of Vaccine Effectiveness of BNT162b2 and mRNA-1273 COVID-19 Vaccines in Preventing SARS-CoV-2 Infection Among Health Care Personnel, First Responders, and Other Essential and Frontline Workers — Eight U.S. Locations, December 2020–March 2021	https://www.cdc.gov/mmwr/volumes/70/wr/mm7013e3.htm
Interim Public Health Recommendations for Fully Vaccinated People	https://www.cdc.gov/coronavirus/2019-ncov/vaccines/fully-vaccinated-guidance.html/
Routine Asymptomatic SARS-CoV-2 Screen Testing of Ontario Long-Term Care Staff After COVID-19 Vaccination	https://covid19-sciencetable.ca/sciencebrief/routine-asymptomatic-sars-cov-2-screen-testing-of-ontario-long-term-care-staff-after-covid-19-vaccination/
mRNA-1273 Sponsor Briefing Document Addendum Vaccines and Related Biological Products Advisory Committee Meeting Presentation December 17, 2020	https://www.fda.gov/media/144453/download
Pfizer-Biontech Covid-19 Vaccine (BNT162, PF-07302048) Vaccines and Related Biological Products Advisory Committee Briefing Document	https://www.fda.gov/media/144246/download
Janssen Biotech, Inc. Covid-19 Vaccine Ad26.COVS.2 Vac31518 (JNJ-78436735) Vaccines and Related Biological Products Advisory Committee February 26, 2021	https://www.fda.gov/media/146219/download
mRNA-1273 Vaccines and Related Biological Products Advisory Committee December 17, 2020	https://www.fda.gov/media/144452/download
Janssen Biotech, Inc. Covid-19 Vaccine Ad26.COVS.2 Vac31518 (JNJ-78436735) Vaccines and Related Biological Products Advisory Committee Sponsor Briefing Document Addendum February 26, 2021	https://www.fda.gov/media/146218/download
FDA-authorized COVID-19 vaccines are effective per real-world evidence	https://www.medrxiv.org/content/10.1101/2021.02.15.21251623v1.full.pdf

synthesized across a multi-state health system	
Early effectiveness of COVID-19 vaccination with BNT162b2 mRNA vaccine and ChAdOx1 adenovirus vector vaccine on symptomatic disease, hospitalisations and mortality in older adults in England	https://www.medrxiv.org/content/10.1101/2021.03.01.21252652v1
Safety and Efficacy of the BNT162b2 mRNA Covid-19 Vaccine	https://www.nejm.org/doi/full/10.1056/NEJMoa2034577
Efficacy and Safety of the mRNA-1273 SARS-CoV-2 Vaccine	https://www.nejm.org/doi/full/10.1056/nejmoa2035389
BNT162b2 mRNA Covid-19 Vaccine in a Nationwide Mass Vaccination Setting	https://www.nejm.org/doi/full/10.1056/NEJMoa2101765
Efficacy of ChAdOx1 nCoV-19 (AZD1222) Vaccine Against SARS-CoV-2 VOC 202012/01 (B.1.1.7)	https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3779160
Effectiveness of BNT162b2 mRNA Vaccine Against Infection and COVID-19 Vaccine Coverage in Healthcare Workers in England, Multicentre Prospective Cohort Study (the SIREN Study)	https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3790399

Asymptomatic Screening

Clinical and Economic Effects of Widespread Rapid Testing to Decrease SARS-CoV-2 Transmission	https://www.acpjournals.org/doi/10.7326/M21-0510
Test sensitivity is secondary to frequency and turnaround time for COVID-19 screening	https://advances.sciencemag.org/content/7/1/eabd5393
Rapid COVID-19 Testing Deployment And Non-Essential Business Sectors	https://esnetwork.ca/briefings/rapid-covid-19-testing-deployment-and-non-essential-business-sectors/

Routine Asymptomatic SARS-CoV-2 Screen Testing of Ontario Long-Term Care Staff After COVID-19 Vaccination	https://covid19-sciencetable.ca/sciencebrief/routine-asymptomatic-sars-cov-2-screen-testing-of-ontario-long-term-care-staff-after-covid-19-vaccination/
Assessment of Psychotropic Drug Prescribing Among Nursing Home Residents in Ontario, Canada, During the COVID-19 Pandemic	https://jamanetwork.com/journals/jamainternalmedicine/fullarticle/2777521

Symptomatic Testing

Interim Public Health Recommendations for Fully Vaccinated People	https://www.cdc.gov/coronavirus/2019-ncov/vaccines/fully-vaccinated-guidance.html/
Update on Emerging SARS-CoV-2 Variants and Vaccine Considerations	https://www.cdc.gov/vaccines/acip/meetings/downloads/slides-2021-05-12/10-COVID-Scobie-508.pdf
Effectiveness of the BNT162b2 Covid-19 Vaccine against the B.1.1.7 and B.1.351 Variants	https://www.nejm.org/doi/full/10.1056/NEJMc2104974#:~:text=Effectiveness%20was%20estimated%20to%20be,confirm%20the%20results%20reported%20above
Efficacy of the ChAdOx1 nCoV-19 Covid-19 Vaccine against the B.1.351 Variant	https://www.nejm.org/doi/full/10.1056/nejmoa2102214

The Future of COVID-19 Testing

Temperature, Humidity, and Latitude Analysis to Estimate Potential Spread and Seasonality of Coronavirus Disease 2019 (COVID-19)	https://jamanetwork.com/journals/jamanetworkopen/article-abstract/2767010
The role of seasonality in the spread of COVID-19 pandemic	https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7892320/
Seasonality and uncertainty in global COVID-19 growth rates	https://www.pnas.org/content/117/44/27456.short



Appendix C: Initial questions for public members

- What is your understanding of the usefulness and/ or effectiveness of rapid diagnostic testing for COVID-19 from a patient/ public perspective?
- In your opinion what role does rapid diagnostic testing play amongst other current public health measures for COVID-19 in Canada?
- Are there certain settings that you think rapid diagnostic testing would be most beneficial in? Why?
- Have you used a rapid diagnostic testing service yourself? Why or why not? Would you have sought it out had you had Covid?
- What do you believe to be the two or three most important aspects of rapid diagnostic testing from a patient/ public perspective?
- Do you think rapid diagnostic testing will be necessary for individuals if they are fully vaccinated? Why or what not?
- Should government funding be allotted to rapid diagnostic testing once the population has reached herd immunity?
- What are some social and/ or economic considerations that come to mind for you in relation to rapid diagnostic testing?

Appendix D: Quantitative Quality of Reporting Assessment for Included Studies

Item	Brosi et al	Du et al	Murakami et al
Q1- Was there a clear question for the study to address?	Yes*	Yes*	Yes*
Q2- Was there a comparison with an appropriate reference standard?	Yes	Yes*	Yes*
Q3- Did all patients get the diagnostic test and reference standard?	Maybe*	Yes*	Yes*
Q4- Could the results of the test have been influenced by the results of the reference standard?	Maybe*	Maybe*	Maybe
Q5- Is the disease status of the tested population clearly described?	Yes*	Yes*	Yes*
Q6- Were the methods for performing the test described in sufficient detail?	Yes*	Yes*	Yes
Q9- Can the results be applied to your patients/the population of interest?	Yes	Yes	Yes
Q10- Can the test be applied to your patient or population of interest?	Yes	Maybe	Maybe
Q11- Were all outcomes important to the individual or population considered?	Yes*	Yes*	Yes*

Articles assessed using the CASP (Critical Assessment Skills Program) checklist for Diagnostic Test studies (available at: <https://casp-uk.net/casp-tools-checklists/>). Quantitative items reported; items #7, #8 and #12 excluded.

*=Initial consensus by two independent reviewers. Results for other items determined following review of differences in reviewers' scores.